

The Iron Age

A Review of the Hardware and Metal Trades.

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The Cincinnati Industrial Exposition.

We present this week a very faithful illustration of the buildings of the Cincinnati Industrial Exposition, in which the fourth annual exposition of that city will be held from the 3d of September until the 4th of October next. The buildings are five in number, including the Art Hall, which is connected with the rest by a bridge across Elm street, as shown in the engraving.

As the buildings cover the whole space, there was no opportunity of enlarging them this season, although every available foot of the seven acres was occupied last year, and the applications for space already named show that much more floor room could be profitably utilized.

A number of changes, however, will be made inside, and several important new features introduced. The improvements already described

than August 30, otherwise they will be entered for exhibition only; and all articles must be in position ready for exhibition by Tuesday, September 2. The driving engines will be in operation one week previous to the opening of the Exposition to the public, and exhibitors of machinery in motion will be required to have their machines in running order on the day of opening.

Fourth.—Each exhibitor (except in the Ladies' Department) will be required to pay an entry fee of two dollars. An exhibitor competing for more than one premium (except in the Horticultural Department) shall pay two dollars for each additional premium competed for.

Each exhibitor will have the privilege, upon payment of two dollars in addition to the entry fee for his articles, of securing a ticket of admission (positively not transferable) which

ing machines, mangles, ironing, and clothes drying apparatus.

Class 15—Tobacco machinery.

Class 16—Unclassified machinery and appliances.

Class 17—Marine and submarine diving bells, models, life-saving apparatus, buoys, etc.

DEPARTMENT B—AGRICULTURAL MACHINERY.

Class 18—Mowers, reapers, threshers, seed drills, and attachments.

Class 19—Plows, cultivators, rakes, miscellaneous agricultural implements and appliances.

Class 20—Beehives, etc.

Class 21—Cane and cider mills and sugar evaporating machinery.

Class 22—Grinding and feed mills and grain separating and cleaning machinery, etc.

DEPARTMENT C—IRON, STEEL, METALS, CASTINGS, ETC.

Class 23—Ores and metals.

Class 24—Iron, steel, etc.

Class 25—Saws, scales, and bells.

Class 26—Castings, ironwork, etc.

screws made from it. Having personally conducted a series of comparative tests with iron and Bessemer metal screws, I have no hesitation in expressing the opinion that the latter are superior, in all respects, to any iron screws I have ever seen. My own experience leads me to believe that they will bear from two to three times more strain than the best iron screws in the market, and as they can be made at the same cost, and sold at the same price, they will prove a valuable addition to stocks of builders' hardware, especially the large sizes.

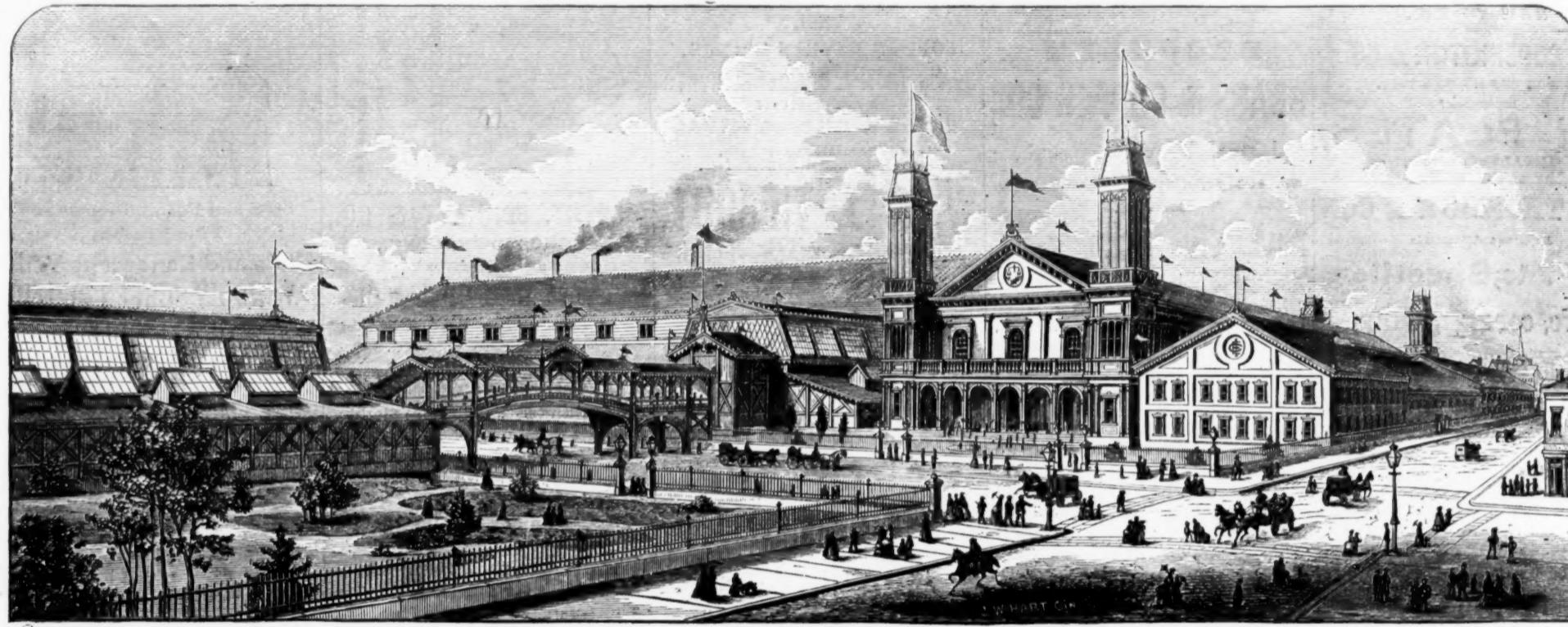
I send you specimens of wire curled and twisted into all possible shapes, "blanks" bent double and hammered flat without even checking, spiral springs twisted from fine wire, which

will bear enormous strain without taking a permanent set, and one piece of wire which

bore nine twists without breaking. As these

specimens must be seen to be appreciated, I

the aid of illustrations, if at all. So perfect is the mechanism by which the screw is fashioned that the wire is seized but three times in the whole process, which may be outlined as follows: The wire is placed upon a reel and the end inserted between a pair of feed rolls which feed it to the header, a machine which cuts the wire into the lengths to which it is gauged and sets up the heads, which is done by pressing the end of the wire into a die. The screw at this stage is called a "blank." The next process is that of cleaning, as the blanks are covered with grease and dirt which must be removed. To effect this they are placed in iron boxes filled with white pine sawdust. These boxes are revolved rapidly, and the friction of the sawdust cleanses them perfectly and makes them bright. After many experiments, it has been found that pine sawdust is best adapted to this use, as it contains no acid which



CINCINNATI INDUSTRIAL EXPOSITION BUILDINGS.

in the main hall will work almost a complete transformation in that room. First, the exhibiting space will be so divided as to leave several broad aisles. In the center, where these aisles converge, there will be an elaborately decorated pavilion, sixteen feet in diameter, and reaching nearly to the roof of the hall. In the second story this will be filled in the morning with the Newport Barracks Band, and in the afternoon and evening with Currier's Band.

Another improvement, as comfortable as it is comely, will be the two seated balconies projecting from the galleries around the room. They are already completed, and will make a handsome appearance. Their object, however, is not so much to please the eye as to rest the weary sight-seers. In the preceding expositions there have been very meager accommodations, we might better say no accommodations at all, for seating the multitudes tired with hours of walking and looking.

The front yard has been improved by sodding the plat surrounding the fountain. The Horticultural Hall is being tastefully arranged with rustic grottoes, fountains, vines, ferns, and various plants, while the entrance from the outside to this room will be covered by a green and shady bower, as inviting as the floral attractions within. The narrow strip of space on the south side of this department is being covered to afford a little more room. In Power Hall, South Hall, and other portions of the building, the work of preparation is also being pushed forward vigorously.

As many of our readers will be exhibitors, we publish the following rules, which will be strictly adhered to in every instance:

"First.—The halls and grounds will be open for the reception of articles on Monday, August 4, to Saturday, August 30. On Wednesday, September 3, the exposition will be opened to the public, and will continue open from day to day (Sundays excepted) from 9 o'clock a. m. to 10 o'clock p. m., until Saturday evening, October 4.

"Second.—All articles will be entered for exhibition only, except those specifically named in the published list of articles to which premiums will be awarded. Articles named in the premium list may be entered for exhibition or competition, at the option of the exhibitor, which must not be later than August 30.

"Third.—Articles intended for competition must be entered on the books as such not later

will admit him at all hours of the Exposition. Not more than two exhibitors' admission tickets will be issued to a firm or corporation.

"Fifth.—All applications for space must be made on or before the 20th of August, on the printed blank forms, which will be furnished by the secretary, and applicants after that date will not be allotted space until those entered by the 20th of August have been assigned.

"Sixth.—Applications for space must state the exact amount and kind required; and for machinery, show cases, etc., a plan of the floor, counter, or wall space must accompany the application. The exact dimensions and style of show cases should be particularly specified.

"Seventh.—Space allotted to applicants, and not occupied by them on or before Saturday, August 30, may be assigned to other exhibitors. And the Board reserve the right to exclude from the Exposition patent medicines, nostrums, and articles of an explosive, highly inflammable, dangerous or offensive character.

"Eighth.—The premium list will be published, and all awards shall be for the first degree of merit in each class. No second-class awards or decisions will be made or reported in any case, excepting in the Horticultural Departments."

The following shows the classification of the premium list for articles in which our readers are chiefly interested:

DEPARTMENT A—MACHINERY.

Class 1—Steam engines, boilers, steam pumps, steam hammers, and all apparatus operated directly by steam.

Class 2—Steam boiler and engine fittings, including governors, safety valves, steam gauges, water gauges, low and high water alarms, grate bars, and appliances.

Class 3—Turbine water wheels and other hydraulic machinery, exclusive of steam pumps.

Class 4—Electric engines, air and caloric engines, gas engines, and other prime movers, motive powers, not included in classes 1 and 3.

Class 5—Machinists' tools and general metal-working machinery.

Class 6—Wood working machinery.

Class 7—Printing, stereotyping, lithographing, engraving, book binding, and tag machinery, with appliances, materials, and samples.

Class 8—Sewing machines. [By special request, no premiums will be awarded in this class.]

Class 9—Cotton, woolen, paper, hemp, and rag machinery.

Class 10—Distilling and rectifying machinery and processes. [By special request, no premiums will be offered in this class.]

Class 11—Pressure blowers, power fans, bellows, air pumps, etc.

Class 12—Hoisting machinery.

Class 13—Boot, shoe, and leather machinery.

Class 14—Washing machines, wringers, crimp-

machines, mangles, ironing, and clothes drying apparatus.

Class 27.

DEPARTMENT E—COOKING, HEATING, AND VENTILATING APPARATUS.

Class 28—Cooking and heating stoves, ranges, furnaces, steam heaters, and ventilators. [By request, no premiums are offered on stoves.]

DEPARTMENT F—BUILDING MATERIALS AND GENERAL HARDWARE.

Class 29—Building and general hardware.

Class 30—Edge tools and cutlery.

Class 31—Undertakers' goods.

Class 32—Grates and marble, slate, and imitation mantels.

Class 33—Marble, stone, and imitations, brick, terra cotta, etc.

Class 34—Gas and lamp fixtures, etc.

Class 35—Plumbers' goods, etc.

Class 36—Tin, galvanized iron, sheet iron, sheet brass, and copper work.

Class 37—Fire and burglar proof safes, bank and safe locks.

Class 38—Carpenters', joiners', carvers', stair builders' work, etc.

Class 39—Plate and ornamental window glass, painting, etc.

BESSEMER STEEL WOOD SCREWS.

The Works and Product of the Union Steel Screw Company, Cleveland, Ohio.

(Correspondence of The Iron Age.)

The establishment of a large and well appointed factory for the manufacture of Bessemer metal wood screws, at Cleveland, Ohio, is an event of no small importance to the hardware trade of the country. The factory of which I speak is owned by a stock company, composed principally, if not wholly, of gentlemen prominently connected with iron manufacturing operations, with the following officers:

Mr. Stillman Witt, president; Mr. Fayette Brown, vice-president; Mr. J. A. Bidwell, superintendent, and Mr. John T. Norton, secretary. The buildings, which are substantially built of brick, cover considerable ground space and are several stories high. With their machinery, they represent an investment of \$1,000,000, and from appearances I should say that even that large sum had been judiciously expended, for a better appointed establishment, or one better adapted for the operations intended to be carried on within it, I have never seen.

As the manufacture of Bessemer metal screws is a new industry, and as that metal is not commonly supposed to possess qualities adapting it to that use, your readers may be interested in knowing something about the quality of the

send them, so that any readers of *The Iron Age* who may feel an interest in the subject, either scientific or practical, may have opportunity of seeing them.

The Bessemer metal wire is made from rail ends at the Bessemer steel works, at Newburg, near Cleveland. The process by which it is annealed and made both tough and ductile is, I believe, a secret one; at least, it is one which, if I knew it, I should not feel at liberty to describe. I am informed that a great deal of time and labor has been spent in perfecting the process, and that it has to be subjected to a treatment the reverse of that employed with iron. Certainly it has been wonderfully successful in imparting to Bessemer steel properties and qualities which it was never before supposed to possess, and the discovery is one of great commercial value, as well as metallurgical interest.

The Union Works began operations in January last, under conditions far from encouraging. The business was a new one in the West, skilled labor could not be obtained, and the machinery had to be made on the ground. Good management, however, and the practical knowledge of the superintendent, Mr. Bidwell, overcame all obstacles, and the business is now established on a most satisfactory basis. The mill has now 10 headers, 50 shavers and 100 finishers in operation. Its present capacity is 1000 gross per day. In a few months it will have 44 headers, 236 shavers and 736 finishers at work, which will make the capacity of the establishment 15,000 gross per day. They now employ about 116 operatives, of whom 31 are engaged in tending screw machines; but when running to its capacity the mill will employ 300 hands. Much of the machinery has been improved, simplified and rendered more effective by Mr. Bidwell, who fully understands the business, and who personally supervises its construction. No labor or expense is spared to make the establishment complete in all its departments, and the intention of the company is to make these works the most important of their kind in the country. They have certainly made a good beginning, and one which gives promise of the most satisfactory financial success.

The process of making a screw is one with which most readers of your journal are, doubtless, already familiar, but those who are not may find a brief description interesting, although the machinery by which it is effected could not be intelligently described without

disclosing the metal. After cleaning, the blanks are placed in the hoppers of the shaving machines, from which they are picked up by claws, inserted in spindles which turn the heads, cut the slots and eject them into boxes. They are then placed in the hoppers of the finishing machines, which automatically complete the process of pointing and cutting the thread. These machines are marvels of ingenuity, and seem to possess almost human intelligence. Certainly, their iron fingers possess more dexterity than can ever be imparted to those of the human hand, so far as the forming of screws is concerned. When anything goes wrong they cease to perform their accustomed functions, and give a warning which sounds as much like "Stop! stop! stop! stop!" rapidly uttered, as if they had been designed for talking machines, as well. I will not attempt to describe either their construction or operation in greater detail, for they must be seen at work to be appreciated, and carefully examined to be understood.

Of the finished product I need say but little in addition to that already said. After being sifted, to clear them of shavings, &c., they are assorted and put up in gross boxes. These boxes, which are a vast improvement upon the old style of paper wrappers, are made of stout pasteboard, and will be found much more convenient by those using screws than any other form of package yet introduced to the trade. The steel screws possess a beautiful finish, and are pointed with such accuracy and fineness that they may be driven into the hardest wood without previously boring an awl or gimlet hole. I have myself driven a slender inch and a quarter screw through the hardest seasoned oak without oiling or making an awl hole, and without spreading the head, though sinking it below the surface. When driven, say, half their length into hard wood, or held in a vise, the steel screws may be bent at right angles without breaking. Thus far the company have found a market for their entire product in and about Cleveland, but it is to be hoped that, with increased facilities, they will be able to supply the Eastern market as well.

I have already extended this letter beyond the limits I had prescribed for it, but I cannot conclude without a few words of commendation upon the perfect system which is maintained in every department of the works. An establishment so well ordered and so perfectly neat I have never had the good fortune to see. Everything has its place and everything is kept in its place. There is nothing "lying around" out of place, no bits of metal, nor odds and ends, swept into out-of-the-way corners, no grease spots on the floor nor unsightly objects to destroy the pleasant, cheerful and business-like appearance of the various rooms. As a consequence, nothing is ever lost or wasted, and the operatives appear to take a pride and pleasure in observing rules which conduce as much to their own comfort and convenience as to the business interests of their employers.

In short, it is a model factory, and under its present excellent management the company have every reason to anticipate a permanent and constantly increasing prosperity.

CLEVELAND, July 20, 1873.

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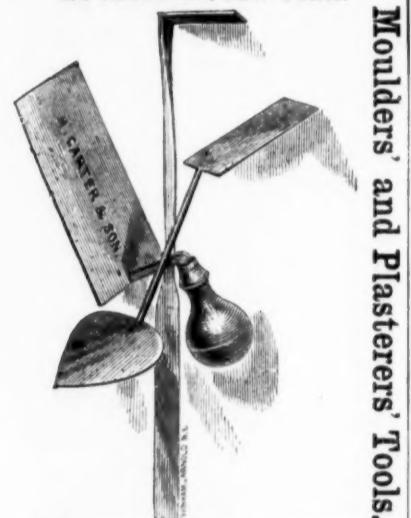
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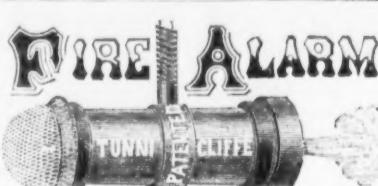


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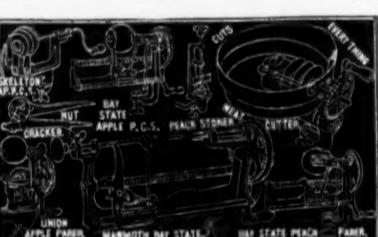
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Iron Manufacture in the Virginias.

(From an Occasional Correspondent.)

ALEXANDRIA, V. A., July 22, 1873.

To the Editor of The Iron Age: Some months ago I sent you an estimate of the probable amount of coal that could be mined from four veins alone (not over one-half of the aggregate of all the veins, however) in the State of West Virginia. You will recollect this liberal calculation gave 240,000,000,000 tons of coal, amounting to thirteen times the estimated amount of the anthracite regions of Pennsylvania, and enough to supply the present demands of the United States for about eight thousand years. The cost of making pig iron at many places along the line of the Chesapeake & Ohio Railroad from red and brown hematite ores, with the Kanawha splint coal, I gave at \$15.85 per ton at the furnace.

Since this communication was sent you great changes have taken place at home and abroad, and it is easily demonstrated that the place to make from the cheapest is certainly where all the elements for its production are found in close proximity and in abundant supply. Professor Cox, geologist of the State of Indiana,

same, for the purpose of collecting the metal prior to its being used for casting.

Its principal feature consists in the combination, with a discharge spout, or tapping orifice, located at the base of a cupola furnace, or a separate receiver, of a vertically sliding gate, or cut-off, consisting essentially of a metallic cup-shaped frame, adapted for the reception of a valve, or cut-off proper, formed of burned clay, fire brick, or other material capable of withstanding heat.

A second feature consists in the combination or relative arrangement, with said metallic receiving-frame and burned fire brick cut-off, of a spiral, coiled or other spring, whose function is to exert a continuous pressure upon the cut-off, for holding it in contact with the bed of the discharge orifice, to produce a tight joint for preventing the escape of molten metal caused by the pressure within the furnace; said spring serving also to adjust the cut-off horizontally for compensating for the wear of its acting surface or that of its bed.

A third feature consists in the provision of a discharge spout or tube, formed of burned fire clay, which is secured on a metallic frame carrying the cut-off mechanism, and constituting

sible the escape of the scoria or slag and other impurities floating on the surface of the metal. In certain cases it is generally found preferable to draw the metal from the furnace into a receiver or collecting basin, where the pure metal, acting by the laws of gravitation, settles to the bottom of the same, while the scoria or slag, being light, will float on the surface of the same. The cut-off devices being applied to the lower or bottom end of said receiving tank, it will of course be apparent that nothing but the pure metal can pass through the same, thus rendering possible the formation of first-class castings direct from the furnace.

The surface of the burned fire-clay bed must project beyond the outer face of the holding-plate B; and the acting face of the cut-off plug or valve of fire-clay must also project beyond its holding-up to allow the acting faces of the bed and plug to be kept in constant contact by the force of the spring, which is effected by the action of the latter in pushing the cup-guides M constantly outward, and the plug-value, L, inward as it wears. When the latter is worn too thin it can be easily replaced, and when the bed is worn down even with the outer plate, it can also be replaced by another.

The device is manufactured complete in itself, and applied for use with either the furnace or a separate ladle, by simply making screw holes in the thing to receive the screw shanks of the cut-off device; and in this respect is made a new article of manufacture and commerce in the trade or iron-melting business.

Claim 1. The combination, with the discharge orifice of a melting furnace, or separate receiver, of a sliding cut-off gate, consisting of a composition, or burned fire clay, valve or plug, L, and a metallic holding or operating frame, H, therefor, as herein set forth.

2. The adjustable fire-clay plug, or valve, L, and receiving frame, H, combined with a spring, K, as and for the purpose set forth.

3. The independent, or detachable, receiving frame, A, B, adapted for the reception of a composition, or burned fire clay, bed-piece or discharge tube, F G, and an adjustable fire clay valve, L, as described.

4. The bed-piece, F G G, secured within the openings in the plates, A, B, by means of the beveled seats of the latter, constituting a champing device, as set forth.

5. In a cut-off device for melting furnaces, a removable fire clay plug, valve, or stopper, having a constant pressing adjustment upon its bed at right angles to its opening and closing movement upon the latter.

6. In such a cut-off device, the combination of a removable fire brick clay plug, or valve, with a removable fire brick clay bed, to effect the replacement of one or both when required.

7. An attachable cut-off device or gate for furnaces or furnace ladles, as a new article of manufacture and trade.

IMPROVEMENT IN THE MANUFACTURE OF IRON AND STEEL.

Specification forming part of Letters Patent No. 140,761, dated July 15, 1873, issued to Ogden Bolton, Jr., and John Pedder, of Pittsburgh, Pennsylvania.

The nature of our invention relates to the manufacture of iron and steel; and it consists in placing the iron sponge in a tube, box, or mold, of any suitable description, and covering the same by a lid or a covering of charcoal, or other suitable carbonaceous matter, or sand, or loam, and in washing or dipping the tube or mold in some suitable fluid so as to coat it over, and thus protect it from oxidation.

We take iron sponge and place it in a box, tube, or mold, of any suitable kind, and cover it with a lid, or covering of charcoal, sand, or loam, and charge the same into a furnace or cupola. In order to prevent the oxidation of the mold we dip it in a clay wash, or a wash of clay and black-lead, which forms a coating for its protection while in the furnace. We place the iron ore, or ore mixed with carbon, (and, when necessary, with lime), in a box, tube, or mold, suitably covered, and charge the same into a bath of melted pig iron or steel, or we may coat the iron sponge or reduced oxide of iron (preferably in a reduced state) with black loam, black lead, clay, or other like suitable material. In case the sponge should contain much foreign matter, such as silica, alumina, or lime, we flux this matter, so that when the mold and its contents are heated and compressed the foreign matter will squeeze out, leaving the sponge nearly pure and in a compressed state. The compressed sponge may then be used either in a steel melting furnace, crucible, puddling furnace, or worked in any other way. The sponge may in any case be either hot or cold, as desired, when first placed in the mold.

We know that the use of molds or tubes broadly, is not now new (witness our patent No. 135,512), and do not broadly claim such in this application; nor do we claim broadly the immersion of metal in a bath of cast-iron; but

What we do claim as our invention, and desire to secure by Letters Patent, is the method herein described of manufacturing iron or steel from "sponge" by the inclosure of the sponge in molds or tubes, and covering said molds with a coating of clay or clay and black-lead, substantially as set forth.

It is rumored that the Terre Haute and Indianapolis Railway Company thinks of moving its shops from Terre Haute to Indianapolis.

who has just visited the iron regions of Cleveland, England, states that the vein of ore is 13 feet wide, 12 feet high, and extends for about 20 miles. This ore only yields about 33 per cent. of metallic iron in the blast furnace, and yet this ore bed supplies the 101 blast furnaces of the greatest pig iron district in the world. From what I have seen in Virginia, I believe there are many places where the veins extend as great, and even greater, length than in the Cleveland iron ore district of England, and where working has been undertaken some veins have been opened as great as 60 feet wide and 10 to 20 feet high, of ore that will yield from 40 to 50 per cent. in the blast furnace. In this State alone, then, could there be a thousand blast furnaces, consuming her ores and the West Virginia coals, supplying the world with cheap iron, and it would take almost a century to convince us that there was any prospect of our exhausting the supply of either the ore or the coal.

Since I wrote you last the whole east front of the Blue Ridge Mountains in this State has been prospected, and the mining engineers of the Reading Railroad Company, of Pennsylvania, after an examination of several days in the Piedmont region of Virginia, report that they find magnetic and specular iron ores, apparently as rich as Lake Superior or Iron Mountain ores, and in practically inexhaustible quantities. These last mentioned ores complete the list of iron ores, and give us every variety within from 75 to 150 miles of the coals, and shows these two States of Virginia and West Virginia to possess all the elements for the production of cheap iron in all its forms, to an extent and quantity nowhere heretofore found in the world.

The magnetic and specular ores we hope to ship in large quantities to the furnaces of the anthracite regions of Pennsylvania. The anthracite coals will, however, in a few years be all wanted for household and steam purposes for the populous and thickly settled portions of the northeast portions of this country. So Pennsylvania will want our coal.

And why bring the Lake Superior and Iron Mountain ores to Pennsylvania, at a cost of \$15 per ton, to make iron, when Virginia and West Virginia have all the elements close together, and can make iron at an immense profit to sell at even 25 per cent. less than the selling price to-day? These two States must eventually become the seat of the greatest iron making region in the world. English capital is rapidly coming here for investment in these lands, and the capitalists of our own country should look to it well that they secure, before it is too late, portions of the mineral lands of these States for their future uses.

M. T.

New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN VALVES OR CUT-OFFS FOR CUPOLA AND OTHER FURNACES.

Specification forming part of Letters Patent No. 139,693, dated June 10, 1873, issued to William H. Ward, of Auburn, N. Y.:

This invention has for its object to furnish a gate cut-off, or device for drawing molten metals in a pure state from cupola or melting furnaces, or from a receiving chamber, or reservoir, located in a position adjacent to the

upper side of the cut-off holder is formed with a horizontal post, O, for the reception of a laterally extending manipulating lever, R, which has its fulcrum at its end on the pin or post Q projecting from the plate B. The lower side of the receiving socket H is cut away to a sufficient extent for forming, in connection with a concave-surfaced groove in the composition plug L, a channel, N, for the escape of small or regular quantities of metal from the discharge-spout G.

A gate or cut-off device, constructed as above described, is adapted to be applied to the base of a melting furnace for drawing off the molten metal directly from the same, rendering impos-

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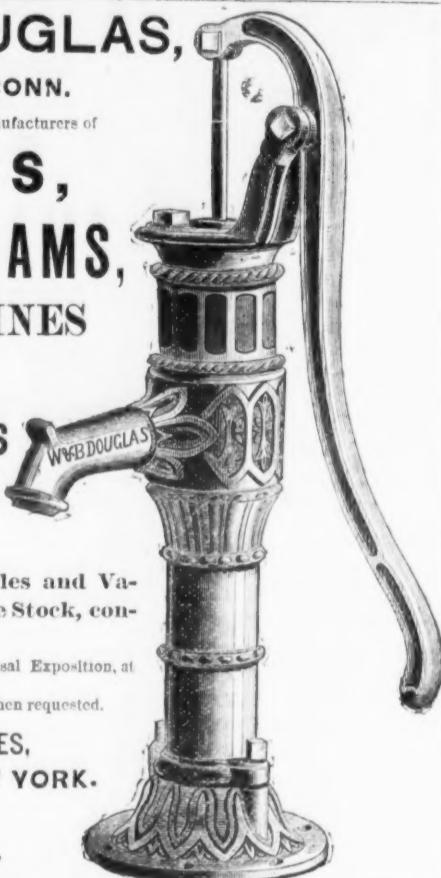
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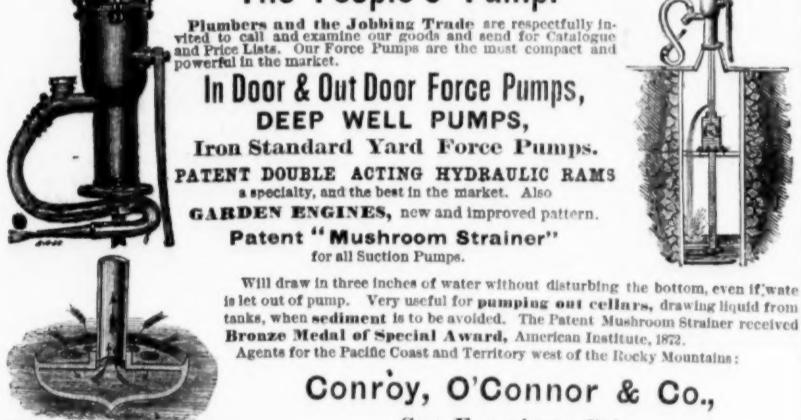
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Elaborate calculations have established the fact that a train moving at sixty miles an hour has a momentum equal to about one hundred and twenty foot pounds of power for every pound of weight in the train itself. To stop the train this power must be neutralized, either by friction upon brake blocks applied to the car wheels, or by the compression of an elastic body like steam or air in the steam cylinders and valve chests, or the sliding of the wheels upon the rails. It stands to reason that a number of brake blocks brought simultaneously upon all or a larger portion of the wheels of a train will consume more power, in other words, exert a greater retarding force than the friction on the rails of the locomotive drivers (acting against the reversed action of the pistons). Also, that if the pressure on the blocks be kept below that which would entirely stop the revolution of the wheels, the uneven wear of the latter from skidding will be avoided. But in reversing the motion of the locomotive wheels there must be a point where the latter "slide" for a space, and however small this may be, it introduces a source of damage worth looking after and guarding against.

From what has been said concerning the relations of weight and speed in the stopping of trains, it may be readily inferred that a fixed and arbitrary degree of power for working the brakes, irrespective of the conditions named, may be a source of evident and positive mischief; for a force that with a light load and low speed would skid the wheels, would, with a higher velocity and greater weight, prove wholly ineffective in the proper management of the train. With brakes actuated by devices under direct control of the engineer, as by compressed air turned on or off by a simple valve, the pressure of the blocks may be regulated at will, and in obedience to that consciousness of the fitness of things which permeates the brain of the experienced engine driver, but which can hardly be explained to those uninitiated in it by practice. This variability, or adjustability, as it may be termed, is found only within narrow limits in the back pressure system, which I am strongly inclined to think will find its chief utility as an appliance additional to the use of properly constructed brakes, just as the injector is in general railway practice seldom used without the arrangement for use in emergency, of feed pumps capable of doing its work. It is not difficult to imagine a locomotive furnished with both apparatus for stopping or slowing, one or the other to be used as circumstances may seem to render preferable, and both to be simultaneously put in operation in circumstances of unusual danger. But even in this restricted sphere, the back pressure system must be necessarily used in one or another of its most recent and improved forms. The

old-time results of reversing; the drawing of gaseous products of combustion from the smoke-stack into the cylinders and their subsequent transfer to the boiler; the heating of pistons and carbonization of packing; the biting of slide valves on their port faces and the interference, from the presence of incondensable gases in the steam, with the working of the injectors—drawbacks that have been known to temporarily disable an engine in the space of five minutes—must be obviated. This, it is claimed, may be accomplished wholly by Chalber's invention. This, as is well known, embraces simply a pipe from the boiler opening inward to the cylinders at the exhaust, so that water is sprayed against the hot surfaces of pistons and cylinders, and converted into steam, a portion of which, passing in the usual channel, serves to keep up the blast in the stack and prevent the inward draw, during the reversed action of the engine, of the gaseous products of combustion. Another system, an American one, contemplates the use of a simple valve in the exhaust, to shut off the inward current of gases from the cylinders. In this case, air alone would be admitted, but trials made on a French line under such conditions showed that the packing carbonized during a run of from two to three miles, a result, however, which might have been modified or avoided by the use of the more recently introduced packings of fibrous asbestos or powdered soap-stone, so efficient under high steam and hot air. Modified by modifications like, or answering similar purposes to, these, back-pressure will no doubt prove an important assistant to the engineer, but it cannot displace the use of brake-bars on the cars, or nullify the need of improving the means whereby these are operated, a subject to which some of the best minds in applied technology are wisely directing their attention.

The Johnstown Voice pays the following tribute to the memory of Mr. George Fritz, late superintendent of the Cambria Iron Company, whose sudden death was announced a few days ago:

Mr. Fritz was born in Chester county, in 1830; hence was in his forty-fourth year. Acquiring an ordinary country education, he afterward learned the carpenter's trade and went to Philadelphia, where he worked for some time. He then removed to Norristown, Montgomery county, where he prospered at his trade until 1854, when, with his brother, Mr. John Fritz, he embarked in a new enterprise—the Union Machine Works—at Catawissa. There, however, he remained for only one year. His brother being given control of the Cambria Iron Works here, he accompanied him hither in 1855, and for five years was engaged as head of the drafting department more particularly, though other departments claimed his attention, and exhibited signs of his ability in astonishing, useful and economical improvements.

In 1860 Mr. John Fritz took charge of the iron works at Bethlehem, when Mr. George Fritz was made superintendent of the Cambria Iron Works, and from that day to the day of his death occupied the same position.

To enumerate all his inventions and improvements in the difficult art of making and rolling iron and steel would require too much of our space. One of the most important of these was the invention, in connection with his brother, of trans of rolls "three high." Formerly rail rolls were built "two high," that is two rolls, one above the other. It was found that rails went through such a train too slowly; the iron would cool, and hence the rail crack. Mr. Fritz remedied this by simply placing a third roll immediately above the top one of the two, thus making them "three high," and enabling the workmen to run through the iron or steel at the rate of about one rail a minute, so that the metal has not time to cool during the manipulation. Another of his patent inventions is his "Blooming Mill," for blooming steel ingots. By this mill—a "five-plant" one, as the English call it—more steel can be made than in any other in the world in the same time. With it the Cambria Iron Company are making one hundred and eighty "blooms" of Bessemer per week, or thirty every twenty-four hours. The best English mills make but twelve in the same time.

There are hundreds of improvements about our mills due to Mr. Fritz's ingenuity and industry; but having been prejudiced against taking out letters patent, they will become universal property, and probably other persons will reap the credit and gain of their invention. He had projected many others, also; through his untimely death they will be lost to us and the world.

He also designed all the buildings belonging to the company, and to him is due the admirable order that causes the thousands of workmen and the complicated machinery to run in union and like monotonous clock work, he having selected every foreman and seen that they did their duty faithfully.

In person Mr. Fritz was tall and slender, slightly stooping, muscular, with a very intelligent face. At home he was courteous and kindly in manner; a good husband and father. To all he was rather reserved and grave. Being a warm friend, or bitter enemy, like all such men, he invariably made

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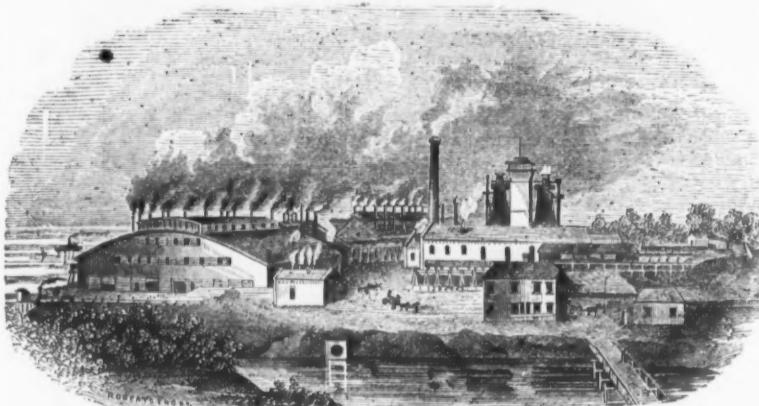
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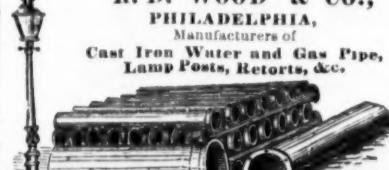
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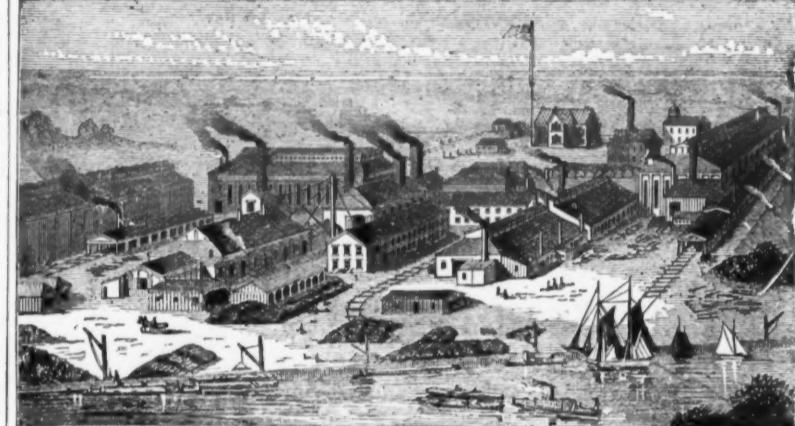
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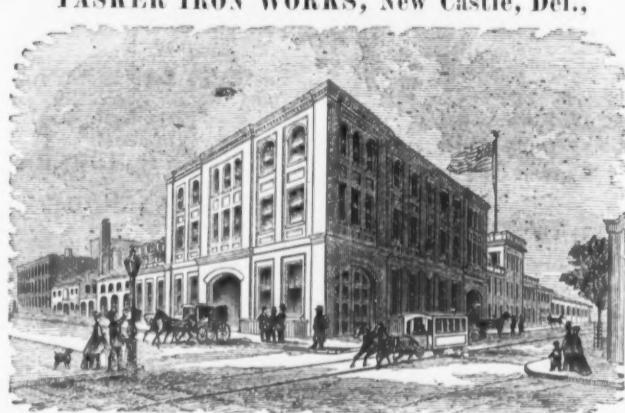
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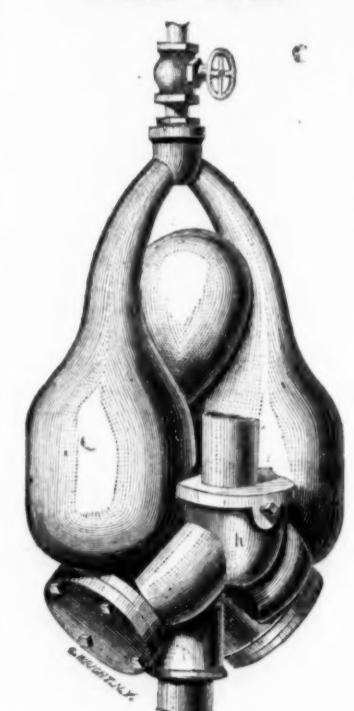
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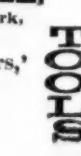
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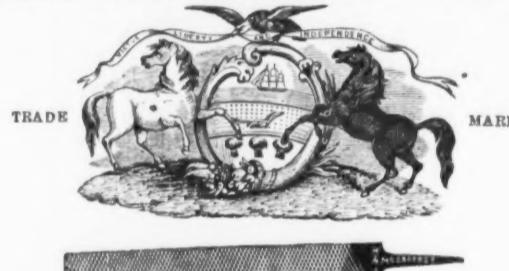
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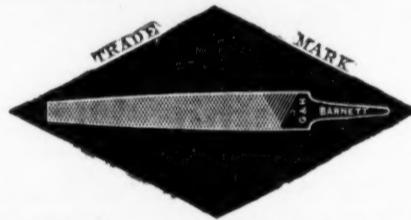
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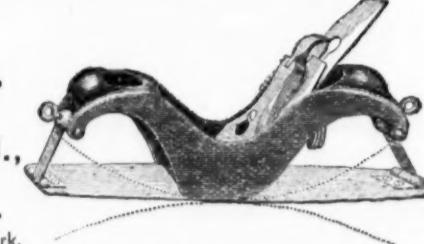
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Dear Sirs: The experience of a year proves that your Furnace Elevator is superior to all others in use. We have in the six weeks from December 1st to Sunday last, 12th Inst., made 724 tons, 144 tons of Metal, an average of nearly 1 ton per day, which required the elevator to lift 172 feet high 4 tons. One Coke and Lime furnace for the raising of 100 tons of Metal, or more than 1,500 tons material in the 6 weeks. The largest yield in one day was 81 1/4 tons, from including the lifting of 34.5 tons material in 24 hours. This has all been done to our satisfaction, and that too, in the coldest weather we have had. Other furnaces with water and pneumatic hoists have experienced great difficulty, on account of the water freezing in the tanks; and in the case of the air hoists, we understand that two furnaces, not far from us, had to "blow out," from being unable to hoist stock during the "cold snap." The difficulty, we are told, was caused by the condensed moisture in the blast freezing to the sides of the cylinders, so that the piston could not move up or down.

Very truly yours,

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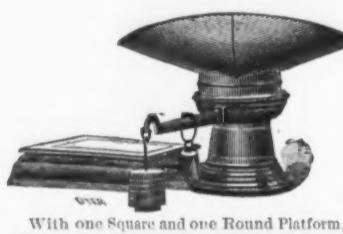
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BUSINESS ITEMS.

NEW YORK.

The engine house of the J. & J. Rogers Company, at Palmer Hill, Clinton county, was burned on Saturday night. It is supposed that the building was fired by an incendiary, for the purpose of destroying the new labor saving drilling machinery the company have lately introduced.

PENNSYLVANIA.

A large dredge, furnished with all the latest improved machinery, is being built at Erie, by the Pennsylvania Railroad Company, for the purpose of digging slips at the harbor of Ashtabula. It will be ready in a short time, and will remove one thousand cubic yards of earth daily. The two government dredges which have been employed at the harbor have deepened and improved the channel so as to afford ample room for the accommodation of the largest craft on the lakes.

Mesara, Wood & Co., of the sheet iron works at McKeesport, are having a large steam hammer built for them by Marchand & Morgan, of Alliance, Ohio.

The employees of the Allentown Rolling Mill Company, at the "Little Mill," have commenced work, the repairs to the puddling engine having been completed. The work of altering the single puddling furnaces into double furnaces progresses rapidly, more than half of them having been remodeled. After the new bar mill is started, all the mills of this company will be in full operation.

Joseph Graff & Co.'s axe and planters' hoe manufacturing, at Beavers Falls, turns out axes and hoes on a very extensive scale. The power is derived from an engine of 200 horse-power, and the company consume about 100 tons of iron and 15 tons of coal per month. They employ about 110 hands.

The new stack at the Lebanon Furnaces has been blown in. The stack is iron cased, 55 ft. high, 16 ft. bosh, and about 200 tons capacity.

The Reading car shops have orders for the construction of 845 cars.

The Union Foundry and Machine Company, at Catawsba, have contracted to furnish 450 tons of car castings to a party in New York.

The Pennsylvania Railroad Company is building a large machine shop at Columbia.

Harber Brothers & Co., Reading, are extensively engaged in the manufacture of miscellaneous light and fancy building and house-furnishing hardware. They employ about 200 hands.

Of the steel works in that city the Harrisburg Patriot says: Between 600 and 700 hands are employed at this extensive establishment, and on the completion of the additions now in progress at the works the number will be increased to nearly 2000. The location of this industrial enterprise at Baldwin has greatly enhanced the value of property in that neighborhood, land situated between the works and the Lochiel Rolling Mill commanding \$2000 per acre, which could have been purchased ten years ago for less than \$300.

MASSACHUSETTS.

The Valley Machine Company are erecting a new building near the railroad depots at Easthampton. It is to be one story high, 200 feet long and 80 feet wide, and will double the working capacity of the establishment. This company are now making a specialty of Wright's bucket plunger steam pumps. About 30 hands are employed, but the number will be increased after removing to the new quarters.

RHODE ISLAND.

The Rhode Island Locomotive Works, at Providence, now employ about 900 men, and turn out 12 engines per month. Orders for over 100 engines are now on hand.

CONNECTICUT.

The National Wire Mattress Co., of New Britain, make about 100 spring-beds per day. They occupy a factory which is filled with new machinery of the most efficient patterns, and gives employment to 75 hands, which number will soon be doubled. The company have sent their beds to all parts of the country, and have received very flattering accounts of them. Among the large buildings they have recently furnished are the Grand Union Hotel, of New York, the new hotel at Goshen, Va., the Jewish Hospital in Philadelphia, and Presbyterian Hospital in New York. Their principal salesroom is at 256 Sixth avenue, New York city. The mattress made by this company is at once a mattress and a spring bed. It cannot get out of order, and never loses its shape, and its cleanliness specially commends it to neat housekeepers. It received the first premium at the Cincinnati Industrial Exposition, in 1872, and at the fair of the American Institute, in New York, the same year.

MICHIGAN.

The Steward Iron Company is a new organization formed for the purpose of developing a property in the vicinity of the Spurr and Michigamme Mines, and which has been purchased from the Marquette, Houghton & Ontonagon Railroad Company for a consideration of \$100,000.

The work of putting in order the old Cliffs Furnace, at Marquette, is progressing rapidly. The stack, when completed, will be 40 feet high, an addition of 10 feet to its former height, and with four foot boshes. The company has added two boilers, 60 inches by 25 feet, and the Mackintosh & Hemphill blowing engine. For the blast they will use 20 inch steam cylinder and 4 foot blowing cylinder; they have also constructed several new coal kilns. When this furnace is in full operation the company expect to produce 20 tons of pig iron per day.

ILLINOIS.

A party has made a proposition to the town of Ottawa, that if the town will give the ground and buildings, at a cost of \$150,000, they will engage in the manufacture of steel, employing about four hundred hands, and with a capital of at least \$500,000. What action the town

will take on this proposition has not as yet transpired.

The National Watch Company, of Elgin, are about to extend their works by the addition of new buildings which will double their present capacity. As they now employ about 400 hands, this shows well for the success of American watches.

A company with a capital of \$500,000 has been organized at Springfield, by the name of the Siemens Steel Works, for the manufacture of steel. The works are to be erected about two miles south of the city at the crossing of the Toledo, Wabash and Western and Chicago and Alton Railroads.

MISSOURI.

The Qualey Foundry and Iron Works, of Hannibal, have commenced work on their foundry at Parsons, Kansas, which will consist of four large buildings, each 50x100 feet.

TENNESSEE.

The rail mill at Chattanooga has thirteen of Dink's puddlers and employs 1500 hands. The capacity of the mill is 100 tons of rails per day.

The work of erecting the car works at Chattanooga, for the Wason Manufacturing Company, is to be commenced at once, and cars are promised from the factory in seventy days. The buildings will occupy 41,000 feet of land.

WISCONSIN.

The Howard Foundry and Machine Works cover two acres of ground at Fort Howard. The main shop is 100x75 feet, and the foundry is 40x75 feet. The stock of patterns in the two large pattern shops is worth from \$40,000 to \$50,000. The company make mill machinery of all kinds, and during the four years it has been in business has built 14 engines and fitted up 4 blast furnaces. It is making extensive docks along the river front, and is about to build a new brick pattern shop. About 40 hands are employed.

OHIO.

The Russell Reaping and Mowing Machines are manufactured by C. Russell & Co., at Canton. The company employ 150 men, and occupy a building three stories high, 220x60 feet, with two wings, 206x60 feet, and one story in height. The capacity of the works is twenty machines per day.

The new blast furnace at Akron will go into operation in August.

The Scioto Valley Fire Brick Company, at Portsmouth, has been incorporated, with a capital of \$25,000.

The patent iron beam, steel, cast and combination plows manufactured by John Ball & Co., at Canton, are gaining for the firm considerable popularity. They have already taken premiums in over thirty State and county fairs.

Lambert & Gordon, of Ironton, are manufacturing two Player hot blasts for Belfont furnace, and three for the Iron and Steel Works, of that place.

It is designed to have the Iron and Steel Works' furnace, now building, at Ironton in operation by December first.

The Burning of the Boston Belting Company's Works.

The Boston Advertiser has the following statement of the loss by the burning of the Boston Belting Company's works, Wednesday evening, estimating the total considerably higher than the telegraphic report:

The building burned was built in 1861, to afford better facilities for the manufacture of hose and belting, and for the storage of raw stock. The first story was used as a grinding and coating room; the second as a pulley room and for storage; the third for the manufacture of belting, and was known as the belting room; the fourth for the manufacture of hose, and the fifth, or upper story, for storage.

At the time of the fire there was but little ready-made stock in the building, but the amount of raw material on hand was immense. This consisted of about 155,000 pounds of gum, worth from fifty cents to a dollar a pound, 150,000 pounds of which were stored in the upper story and totally destroyed, it being reduced to a mere pulp in the racks used for preparing it. The other 5000 pounds were stored in the pulley room, with about \$5000 worth of machinery, all of which was destroyed. On the third story was about \$12,000 worth of machinery, the leather belting of which was all destroyed, and the machinery itself so injured by water and fire as to be unfit for use. On the fourth floor there was but little machinery. The tables which filled the room were covered with the pulp which leaked down through the ceiling. The floor, too, was covered with gum, so as to be very slippery. The loss here will be about \$1000. The upper floor or fifth story, suffered severely and although the last to catch fire, it fared the worst. The floor was burned through in several places, and will have to be taken off. In this story the greater part of the gum was stored. In the building adjoining was a large quantity of belting, which was saved through the strenuous exertions of the firemen, who prevented the fire extending to its roof. The loss to the building is estimated at about \$10,000. The value of the gum destroyed is about \$130,000, added to which is the loss of machinery \$18,000, and the damage to the building \$10,000, which brings the total loss up to about \$158,000.

A correspondent writing from Wales on the state of trade in that district says: "It is now tacitly acknowledged that our iron trade with America has sensibly slackened, for though Dowlaids and one or two other works keep up a fair export thither, the aggregate sent will not compare with the past. It is consoling to find that our business connections with Russia, Sweden, and Norway are extensive, and it is very possible that Japan and Persia will soon figure in the list of customers. One authority in iron matters gives forth the opinion that the falling off in the American trade is caused by a proportional activity in the States. This is only supposition. My impression, and it is not a singular one, is that price is the hindrance. When prices are low the Americans are soon in the market, and if prices fall a revival of the trade might follow. The shipments from the district this week included 1300 tons of rails to Stettin, and heavy cargoes of rails to Riga and Cronstadt, respectively, from Dowlaids and Ebbs Vale. Dowlaids dispatched 500 tons to New York in one cargo and 200 in another. Blaenavon shipped 680 tons to Iballi; Crawshay, a quantity of bars to Naples; and Aberdare, 220 tons of rails to Aarhus. The above is chiefly interesting as expressing the opinions of the Welsh ironmasters regarding the prospects of trade with this country. It is needless to say that the facts of the case do not appear to be understood by the writer or his informants."

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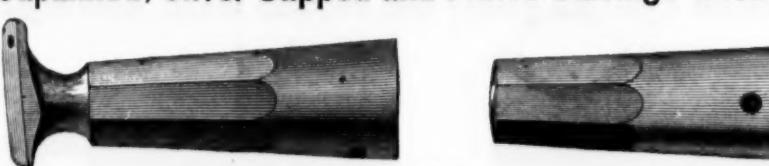
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Japanned, Silver Capped and Plated Carriage Knobs.



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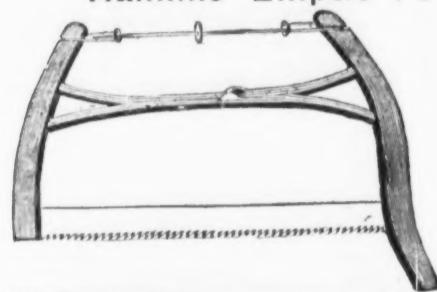
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SAW, TOOL,
STEEL AND FILE WORKS,
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Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.



The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any centre bolt, secures for the Frame great strength and durability.

These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

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Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This is especially the case with cross cuts having Patent Teeth. In the perforated saws all gumming is avoided, and the teeth are easily kept long and in proper shape, saving files, labor, expense and vexation. As is well known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.

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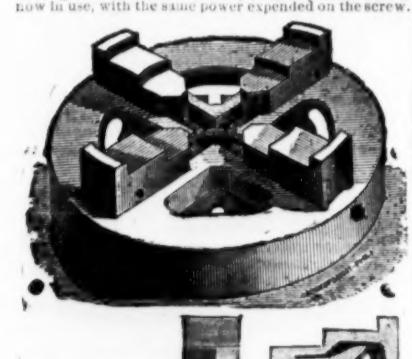
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 THE STRONGEST CHUCK MADE OF
 THE SAME SIZE & WEIGHT.
 CONSTRUCTED ON ENTIRELY NEW PRINCIPLES,
 each Jaw being independent in action and so arranged
 that the work is held firmly and securely, and
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 holding the work more securely than any other Chuck
 now in use, with the same power expended on the screw.



The Jaws are of Cast Steel, the Screws are of Low
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 are ground on a patent machine, automatic in its
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 in this important particular. A saw too tightly
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 cannot be used to the best advantage. The importance
 of so hammering the saw as to effect even strain
 in all its parts, and at the same time RUN TRUE.
 This department is under the personal supervision of
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 I am sole proprietor and manufacturer of the celebrated "Chain-Hinge" Cross-cut Saw. Price Lists
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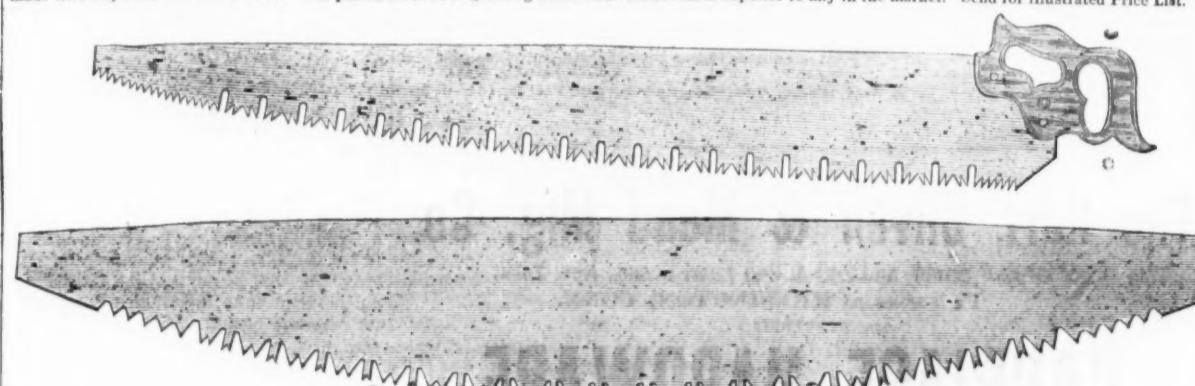
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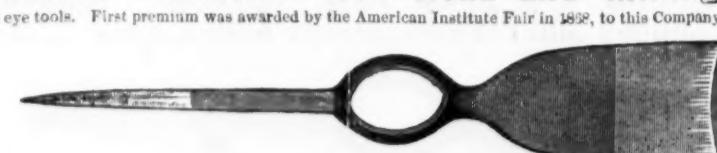
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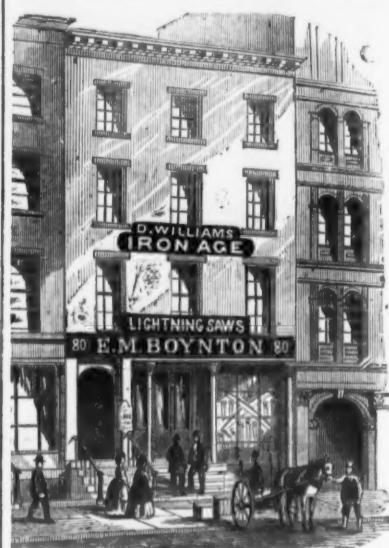
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Have constantly on hand a large supply of COAL, RAIL ROAD AND CALIFORNIA OR MINERS' PICKS. We claim that OUR PRICES ARE LOWER
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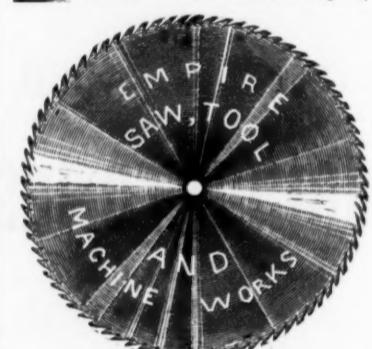
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Artificial Fuel.

A writer in the *English Mechanic* gives the following interesting notes on the subject of artificial fuel:

It is a curious and interesting circumstance that, so far back as the latter end of the reign of Queen Elizabeth, when wood was plentiful and coal but little used, an attempt should have been made to produce artificial fuel for use in the open hearths of that day. About the year 1594, Sir Hugh Platt tried to introduce into general use in England a mixture of coal and loam, according, as he states, after the "manner of Lukeland, in Germany"—wherever that place may be. He used other mixtures, such as sawdust, tanners' bark, cow dung incorporated with small coal, and cemented together with his favorite loam. This is, I believe, the first known attempt to manufacture "artificial fuel."

Curiously enough, it contains the elementary idea of such mixtures suggested up to the present time. All, or nearly all, the schemes that have been produced, set out with the basis of small coal, or pit waste, and mix it with all kind of combustible matter, and cement them together in blocks, or cakes, for ordinary use as a cheap substitute for coal—even when, as we know, that wood was plentiful and sea-coal but slowly coming into general use. At this early period, then, the waste of small coal had attracted notice. After Sir Hugh Platt's laudable attempt, the idea seems to have slipped out of sight, and for nearly two centuries little or no attempt was made to carry on the process.

It was not till the first year of the present century that attention was drawn in any marked degree to the matter, when patent was granted in which small or refuse coal was mixed with charcoal, wood, breeze, tan, turf, sawdust, corkcuttings, peat and other inflammable ingredients. All these, or any of them, were to be well mixed and incorporated together, and then partially carbonized in kilns or ovens, to expel any moisture, the heat being so regulated as just to cement the materials together into one compact mass without destroying any of their combustible properties. This system may be taken as the type of pretty well all the other schemes followed out by adventurers in this proposed line of industry and hoped-for economy. It will be seen at once that for a large scale of production many of the articles introduced could not be obtained in regular supplies at a cheap rate—for tan, corkcuttings and sawdust would be limited in quantity and irregular in supply—so that in the long run any hope of cheap fuel from such a source would terminate in hopeless failure.

We now come to a series of attempts in what was called "Gaseous Coke"—a specious and deceptive term, well adapted for leading enthusiastic experimenters into endless perplexities and profitless disasters. Here the object aimed at was to convert small coal by the addition of coal tar, either in a pure state or mingled with naphtha, and the other ingredients in which it is generally found combined, into a well mixed mass. It was then to be put into a suitable oven, and sufficiently coked to cement all the materials together, to be afterward broken into suitable blocks for use. This partial coking is the leading idea of many attempted experiments, and runs through many patents. Numerous schemes were brought forward to obtain cheap fuel by this method of procedure, but as they all more or less involved the previous manufacture of their most essential ingredient, coal tar, as might have been expected, the anticipations of the numerous projectors were not realized, and led to barren results.

In the year 1823 a step was taken in the right direction, by the simple employment of two of the most abundant of the raw materials of fuel, making the cheaper assist the more costly. In this attempt bituminous coal of good coking quality was mixed with culm, or the small of stone coal, or anthracite, these being mixed together in definite proportions, and then converted into a kind of soft coke in ovens in the usual way, by a partial carbonization. The anthracite was broken small and mixed with a proportion of small bituminous coal sufficient in quantity to make a good freely-burning coke. As far as I am aware, this is the first time in which anthracite is proposed for the purpose. This appears to have been the first rational attempt in really the true direction to combine two abundant raw materials, and if properly carried out might have produced a moderately priced article, useful in time of coal dearth like that now existing. It might, perhaps, be much improved in combustible quality by the addition of a small quantity of the common mineral or earth oils now so abundantly found in many parts of the world, the existence of which at that time was scarcely known. The basis of this plan was of course to enrich the poor anthracite by the bituminous qualities of better coal, and thus obtain a useful material adapted for ordinary purposes.

After this time small coal was combined with lime, clay, marl, blue clay, river salt, or deposits made in stagnant water, and all kinds of earths in general. These were to be broken up small, mixed together, and receive a dose of tar and sufficient small coal to give the mass enough consistency to admit of its formation into cakes, to be afterward dried by air, or by artificial heat. The result would be a poor material blessed with a minimum amount of combustible virtues, and liable to crumble to dust, unless blended together by carbonization like the rest.

About the year 1826 a new and attractive field of investigation and experiment was opened up to the delightful eyes of speculators and experimental inventors. Attention was forcibly drawn to the vast quantities of moss, bog and peat lying comparatively idle, and many efforts were made to utilize this really valuable material as a ready means of producing cheap fuel

—good in quality and abundant in quantity. For this purpose peat-earth, bog and moss, slimy, or any other kind of vegetable earth, were mixed up together, in some cases simply compressed and sold as turfs—in others mixed with nitre, alum, rosin, linseed, green vegetable matter, animal excrements and similar materials—all these were to be ground up together in mills, pressed into molds, then dried by heat, and in some cases partially coked.

Here it will be perceived for the first time that we enter more or less into the domain of chemistry, and such ingredients as nitre and alum are brought into play, to be followed soon after by an endless variety of chemical compounds to facilitate combustion in the more refractory materials employed. In addition to the ordinary bog earth, moss and peat, a long list of other vegetable materials are enumerated, from the bark of trees down to fruits, shells and seeds.

A great variety of costly machines, of more or less complexity, were invented and brought forward for every kind of purpose connected with the much wished for utilization of peat, for cutting, drying, grinding and compressing, with various degrees of success, some of which are in operation at the present time. To these may be added a few machines for the purpose of aiding in the introduction of chemical compounds and combustible substances into the peat and turf, which were to yield oxygen, and heighten the heat of fuel thus prepared; but little or nothing came of these fanciful combinations; they looked well enough on paper, but were of little use, and no profitable results appear to have followed their introduction.

Another plentiful variety of schemes had for their origin the idea of converting peat into coke by means of slow combustion in suitably prepared ovens, thus distilling away many of its most useful properties; the peat coke so prepared was then to be ground to powder, and as before, in many other cases, to be mixed with pitch, tar, rosin, or any other bituminous matter in ovens, to expel any moisture, the heat being so regulated as just to cement the materials together into one compact mass without destroying any of their combustible properties. This system may be taken as the type of pretty well all the other schemes followed out by adventurers in this proposed line of industry and hoped-for economy. It will be seen at once that for a large scale of production many of the articles introduced could not be obtained in regular supplies at a cheap rate—for tan, corkcuttings and sawdust would be limited in quantity and irregular in supply—so that in the long run any hope of cheap fuel from such a source would terminate in hopeless failure.

Another series of speculations now came into favor for a time, the ruling idea being to get hold of any material naturally spongy and porous, or that could be made porous by heat or partial calcination. These partial and imperfect combustibles were to be made use of by filling up their pores with inflammable matter, like spirits in a sponge, and thus it was sanguinely hoped to produce a cheap and plentiful fuel. For this purpose, lime, chalk, clay, brick-earth, porous stones, or any earthy substances which in their nature are capable of being saturated with tar, resin, oily and fatty matter, or hydrocarbons, and other similar materials of this kind, were employed. The porous materials had to be saturated with the combustible materials, allowed to harden, and so in due course became ready for use. In other schemes peat fibres were to be actually glued together by the application of starch, gluten, glue, size, wheat paste, and similar articles, to cement the fibres together—a very sagacious plan, worthy of the wise men of Gotham. It is not necessary here for any practical purpose to go through a pretty long list of abortive attempts to introduce a greater variety of purely chemical means of creating artificial fuel than has been previously alluded to. As a mere matter of curiosity, it may be stated that the following chemicals have been freely employed as mixtures to facilitate the combustion of artificial fuels: Chromate and chlorate of potash, alum, rock salt, nitrates of soda, potash and alumina, nitric and hydrochloric acids, hydrochlorate of lime, sulphuric acid, hydrochlorate of manganese, chloride of manganese, carbonates of soda and magnesia, binoxide of manganese, oxide of iron, ferricyanide of ammonia, acetates of iron and alumina. This long array of chemicals is quoted in order that the reader may judge for himself of the probability of any satisfactory result being obtained from such an amount of complication and science run mad. Little or nothing came of any of the schemes in which this sort of chemical science and materials were involved, so that elaborate and fancy dreams of this nature may be safely neglected, being impracticable and unprofitable on the scale required for the production of fuel for the common purposes of every-day life.

Proposals were also made for utilizing the waste heat from ordinary coking ovens. For this purpose a series of close ovens were placed immediately over the common coking ovens, so that the small waste coal filled into the upper close ovens, or retorts, was sufficiently softened by the action of the waste heat to bind the loose coal into a compact mass; it might then be withdrawn, put into molds, and pressed into blocks by any of the ordinary means in use for that purpose. This method of utilizing waste heat and small coal might be successfully applied at any considerable coking establishment, such as is now used by every railway company for the manufacture of coke. A patent for the above process was given to F. Neville, in the year 1838, and forms the basis of several others for similar purposes.

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The coal, according to this plan, might be softened either by the action of steam or in suitable ovens. Coal alone was used, no extraneous matter of any kind being employed. This is a well devised scheme, at once simple and efficacious. The waste steam from the pit engines might be used for the purpose, or conveyed to a small boiler and reheated at any convenient place near the spoil banks of waste coal.

Frederick Ransome, in the year 1856, brought forward one of the most simple and efficient plans yet devised for the purpose of converting loose small coal into solid blocks at the least amount of trouble and expense. For this purpose the loose small coal is to be placed in suitable molds, then to be passed into an oven, or retort, and is to be just sufficiently heated to cause the loose coal to agglomerate into a compact mass, at once ready for use on being cooled. In this simple process, like that of Bessemer, nothing but the pure coal is employed, being entirely free from foreign admixture or adulteration by any other ingredient, and not so highly carbonized as to be converted into coke.

With suitable heating ovens, or furnaces, this appears to be about as economical a plan as any out of the many yet devised, and such ovens may be readily erected near a pit, and thus daily utilize the waste small coal as it is produced, without employing for heating the molds a single scrap of marketable coal; it is, therefore, admirably adapted for the purpose contemplated.

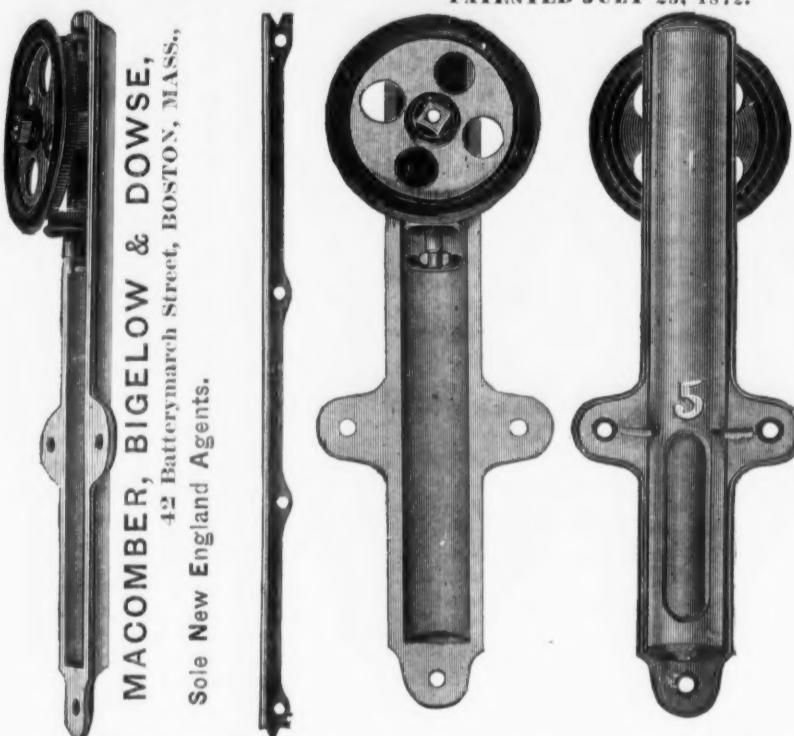
Another idea put forward was that of bringing "all natural coals to a uniform standard of combustible power" by artificial means, increasing the heat giving power of indifferent coals by the addition of definite proportions of coke, resin, naphthaline and pitch, and similar matters, so as to render them equal in combustible strength to the best coals. This system has been hinted at before, but it appears to involve too many processes to render it of any very great economical value on a large scale of operations.

Combinations of small coal and lime in different shapes are numerous, and James Shaw proposes to use waste coal, to which is to be added one-fourth of its bulk of lime, which are to be thoroughly incorporated, then to be slightly moistened—in fact, made into a small coal concrete; then, of course, come the inevitable molds to form the blocks. He states that this preparation gives a more intense heat at less cost, and will last considerably longer than any ordinary coal. Some prefer to use the lime in a slackened state—some, quicklime; any compound containing lime may be used; and some, more simple minded or more ingenious than others, gravely propose to dip their artificial blocks into a cream of lime, and thus dress them up in a summer attire of creamy white.

Some inventors of a more facetious turn of mind appear to have drawn their ideas of preparing artificial fuel from cookery books; here is a specimen proposed by a gentleman of this lively class, evidently of very sanguine temperament. He says good artificial fuel may be produced from limestone, slate, or other

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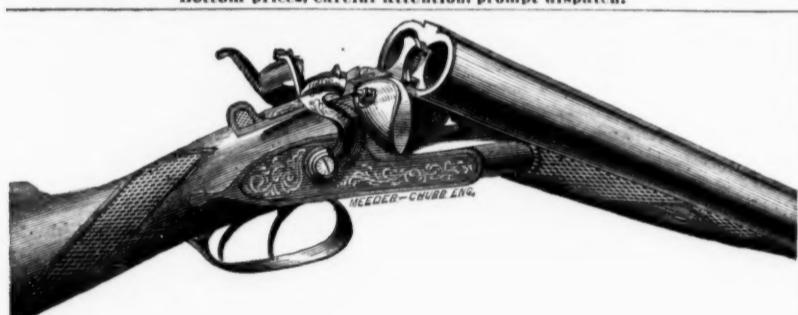
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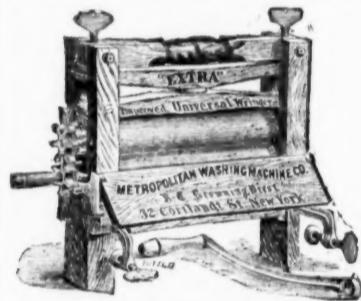
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J. T. Turley, Franklin, Tenn., Writes Nov. 6th,
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J. A. Holbrook, Ogdensburg, N. Y., Writes Nov.
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P. P. Mast & Co., Buckeye Agricultural Works,
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Oscar F. Black, Vergennes, Vt., Writes Dec. 16th,
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J. A. Pinckney, New Market, N. H., Writes Aug.
9th, 1873.—I like my "Novelty" better and better
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J. A. Merrill, Fulton, N. Y., Writes Nov. 25th,
1872.—The Duo-decimo Novelty Press which I pur-
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The Iron Trade at Home and Abroad.

The present position of the American iron market cannot be said to afford much encouragement to either makers or dealers, but there is consolation in the thought that matters cannot become much worse, and that any change must be for the better. Of No. 1 pig iron there are but small stocks, either in makers' hands or in store, and for some months past the furnaces have been living upon their sales of soft iron. Such lots as are offering by makers may be had at about \$45. Of mill irons there is a great accumulation throughout the country, but probably not more than can be profitably marketed before the end of the year. So far as we are able to learn, the rolling mills East and West are pretty much without any considerable stocks of pig, and when orders for rolled iron begin to come in they must all buy at once and, in many instances, buy largely. At present, however, they manifest no disposition to purchase beyond immediate requirements, and while holders of forge irons are as firm as it is possible for them to be under the circumstances, the market is heavy and, for the time, prices tend downward. No. 2 foundry iron can be had in abundance at from \$30 to \$38, and we hear of sales of grey forge, made within the past few days, at \$32. For various reasons our furnaces have lately been running a larger proportion of hard iron than formerly, and as the mills have generally experienced a lack of orders, they have been but moderate buyers for several months past. The sudden falling off in the demand for iron for railroad construction and equipment has been seriously felt. After reaching a consumption of, say, 750,000 tons per annum, railroad building has received a sudden check, and probably the total requirements this year will not much exceed half that amount. The reasons for this are so generally understood that it is not necessary to present them in detail; but in discussing the present position of iron, the fact that the railroads are not taking anything like the amount they were expected to consume must not be left out of consideration. Of rails there is now a considerable accumulation throughout the country, and in this market there are several large lots of foreign rails which have been in hand for a long time. Of foreign iron we are now receiving but little in any form, and the prospects are that we shall receive still less from year to year, until importa-

tions practically cease. The British market could not now supply any considerable American demand, and were such a demand felt, prices then would advance in proportion to its activity until shipments could no longer be made. Our iron masters have, therefore, no reason to anticipate encountering any serious competition in supplying the demands of the home market, and when the promised improvement takes place, they will be in a position to derive exclusive benefit therefrom. That such an improvement will take place we have every reason to believe, and but for the unwise policy of makers generally in seeking to perpetuate an unnatural and excited condition of affairs in the pig-iron market, at a time when trade, if left to regulate itself, would have settled down upon a basis of general and healthy activity, it is doubtful if the iron market would have been depressed to anything like the extent now reported. It is too late however, to undo the mischief already accomplished, but it is to be hoped that makers have learned from experience that it is not the part of wisdom to hold iron above the highest price at which consumers are able to take it, at a time when a serious reaction from extreme activity is the inevitable result of such a policy. Of the state of the labor market it may be said that, so far as we can learn, the iron workers are tractable and disposed to accommodate themselves to circumstances. Difficulties between masters and men are reported from time to time, but they are local, and generally result in the prompt acceptance of employers' terms.

In Great Britain the iron market has changed but little since our last review of the trade was written. There are well marked tendencies toward a reaction from the high prices maintained for so many months, but the decline cannot be great nor rapid under existing conditions. Makers and manufacturers have made no progress toward cheapening production, beyond getting their fuel a little lower, but they find the demand for finished iron so diminished by high prices that they will soon be reduced to a choice between the alternatives of selling their product at lower prices or stopping their works. In some districts there is sufficient demand for certain forms of manufactured iron to keep the works reasonably busy, but the immediate outlook for the trade in general is not encouraging. The difficulty experienced by the British iron masters is not found in the fact that the production of finished iron is in excess of the requirements of the home and foreign markets, but that, at prices which barely cover the increased cost of production, consumption is checked and foreign competition stimulated. There is no evidence of a disposition on the part of miners or iron workers to accept lower wages; ores do not promise to become either cheaper or more abundant; a deficiency in the coal supply, with consequent advance in the cost of raw coal and coke, may be expected as the season advances and increased quantities are needed for domestic and heating purposes, and because of the high prices, which must be maintained until cheaper labor and materials can be secured, foreign orders are not abundant. The loss of most of the American trade in finished iron has been a serious blow to the prosperity of several important districts, as is freely admitted by our British exchanges. Birmingham and Sheffield especially complain of the loss of trade with this country, and are troubled to think that their best customer has within so short a period developed into a formidable rival. There is nothing new to report in the condition of affairs in the Durham and Cleveland districts, but in South Wales matters are approaching a crisis which is awaited with apprehension. The coal and ironstone miners are giving serious trouble, and a stagnation is threatened in all branches of the iron trade of this district—if, indeed, it has not already occurred at the time of this writing. In North Staffordshire several large ironworks are standing idle, and the only healthful activity reported amid the general depression is at Barnsley and Barrow-in-Furness. We do not look for a long continuation of this state of affairs, but while natural causes would bring about an improvement in trade if left to operate unchecked, it remains to be seen to what extent the peculiar circumstances which have contributed to the present depression will retard recovery. A glance at the statistical position of iron, and an estimate of the probable demands of non-producing countries, show that the present condition of affairs cannot continue, but it is a question whether the process of adjusting existing difficulties will require one year or five for its accomplishment. In any case it is idle to look for any great expansion of the iron industries of Great Britain, either in the near or remote future, and a reasonable assurance that the country will continue to hold its own against increasing foreign competition would more than satisfy those whose capital is locked up in furnace and mill property in England.

Advices from the Continent are interesting, as showing the extent to which the iron markets of the Old World have been disturbed by the events which have rendered it impossible for Great Britain to maintain her exports of cheap iron. In Belgium the position of both coal and iron is peculiar. The price of fuel continues to advance, and with it iron has also risen proportionately. In a letter to the *Cote Libre*, dated Charleroi, Belgium, July 26th, we find the following, which gives a very fair indication of the state of the Belgian iron trade: "The Acoy furnaces have published a new price list, according to which rolled iron is established at 27 francs for No. 1, while good quality commands 28 francs. Rolling mills cannot continue to work at late rates; rather than continue at them and make serious losses, they will prefer to close their works. The only article still doing well is rails, and the enhanced rates at which the latest adjudications have been closed sufficiently prove that this branch of iron industry at least is in a sound position. Nor can we wonder at this. Great Britain and Russia are about to enter upon a rivalry in railway building eastward such as the world has not seen before. The struggle is to be who will reach the East Indies by the shortest route, and rails will be in good demand for years to come. Of semi-greasy coal there is now no stock left at this center, and the demand therefore concentrates on lean coal. We quote gas coal 30 francs, with very little stock left in this neighborhood." To accommodate the makers, who find themselves unable to meet orders, the Belgian government has extended for six months the time of delivery for rails lately contracted for. As we shall speak more fully in a future issue, of the causes which contribute to the activity of the Continental rail market, it is unnecessary at this time to more than call attention to the facts noted in the above extract from the *Cote Libre* as explaining the position in Belgium.

In France the iron trade is reported as just now in the worst possible condition. There, as elsewhere, high prices have checked consumption, and the proprietors of the various large iron works have agreed upon diminished production. Buyers are holding off in the hope of getting iron cheaper, and there is no hope of a revival in trade until fuel shall so far decline as to permit operations to be carried on under conditions more favorable to producers. That fuel will soon decline in value is probable, but whether it will fall low enough to stimulate iron manufacture is doubtful. Forge pigs in the Muerthe and Moselle districts are quoted at 130 to 135 francs, and in the Champagne, coke pigs are worth 140 to 145 francs, and charcoal pigs 175 to 177 francs. In the Nord prices of iron are very low, ordinary iron standing at 290 francs, and special brands at 300 to 310 francs. Some lots of rails are mentioned at 320 francs. The position of iron in Germany and Austria is much the same as in Belgium and France, the financial crisis in Vienna having injuriously affected all industries, especially iron manufacture, while coal is dear and transactions in it chiefly of a speculative nature.

From the above hasty summary of recent advices from the principal iron producing countries of the world, it will appear that the iron trade is nowhere in a satisfactory condition. Indeed, it could not reasonably be expected to be, for the great changes which have taken place, especially those affecting production in Great Britain, are of necessity disturbing in their nature, and trade cannot at once adjust itself to the new conditions governing and affecting it. We still believe, however, as we stated some weeks ago in reviewing the home and foreign markets, that we are passing through a period of reaction from unnatural stimulation and high prices, and that when values shall have readjusted themselves upon a natural and permanent basis, consumption will everywhere increase, and iron manufacture prosper wherever it is carried on under naturally favorable conditions. Our reasons for anticipating a gradual and sustained improvement in trade at home and abroad will be given in a future issue.

The Industrial Future of China and Japan.

Advices from the East report that certain English capitalists are about to venture an undertaking which, if successful, will lead to results of immediate and permanent importance to the commercial and, more remotely, the industrial interests of the United States. They propose to conquer by peaceful means the traditional distaste of the Chinese nation for the agencies which promote the development of a modern civilization. Knowing the power of the locomotive as a civilizer, they propose building a short railroad upon Chinese soil, which, when finished, will be presented to the Emperor, in the hope that he will be so pleased with his new possession that he will sanction the construction of a system of lines extending

throughout the empire. If this permission is gained, English capital and enterprise will soon complete the commercial conquest of the Flowery Kingdom, and China, long withdrawn from the fellowship of nations, will once more be drawn within the busy circle of the world's activities and industries. Wherever a railroad is built the standard of civilization is planted, and the steam whistle is potent to exercise the prejudices and superstitions of barbarism. With the establishment of more intimate commercial relations with Europe and America, the production of useful commodities will be stimulated, resources hitherto neglected will be developed, and China will in time—perhaps much sooner than is generally supposed—take her place among the great producing nations of the world.

In view of these possibilities, it becomes interesting to examine the resources of this great country, to the end that we may form some idea of her ability to contribute to the world's production. The foundation of a great industrial development is coal, and China has coal in great abundance. Her known coal fields cover an area of over 127,000 square miles, most of them yielding fuel of superior quality. According to the statement of Mr. Alexander Harvey, interpreter to the British Consul at Newchang, who lately visited some of these fields, they are as yet but imperfectly worked, and with the most primitive machinery. The coal is brought to the surface in baskets suspended on the ends of poles which are balanced on the shoulders of carriers, and no labor-saving appliances of any kind have yet been introduced. In any other country this method of mining would long ago have been abandoned from necessity, but in China labor is cheaper than anything else, and in this superabundance of labor capable of acquiring a high degree of skill in any department of industry, is found another of the nation's resources. A third and most important resource to be drawn upon in the future are her immense deposits of iron. These are said to be very extensive and very rich, and from what little is already known concerning them, they may be said to rival those of the United States. The climate of China is quite as good as our own—better, in some respects, than the average climate of this country; its soil is naturally fertile, or it would not have sustained so great a population during so many centuries of commercial non-intercourse; in short, it lacks none of the primary elements of material greatness, and all that is needed is to impart to the nation the inspiration of progress. No better means of accomplishing this result could have been devised than that proposed by the British capitalists seeking authority to construct railroads throughout the empire, and we have the fullest confidence in the ultimate success of the movement which has for its object the opening of a country which, with all its vast capabilities of development, has as yet contributed comparatively little to the world's production of exchangeable commodities.

The interest which this movement has for the people of the United States is twofold. We may expect to control a considerable share of the foreign trade of China. With Japan we have already established relations which are fast becoming mutually profitable, and our geographical position is such as to secure us a great and permanent advantage over all competitors for the practical control of the Chinese markets. But our interest in the result of the movement is, as we said, twofold, for the reason that China and Japan are evidently destined to become, at no distant day, great producers of commodities, many of which will compete with our own productions in our own and foreign markets. The vast population of these countries will not be allowed to stand idle for want of profitable employment, and those industries which, up to this time, have furnished commodities for export, can never give employment to more than a very small part of the laboring populations. With the influx of foreigners and foreign capital new industries will spring up and new branches of manufacture be established. Both the Chinese and Japanese are imitative and quick to learn, and in their own countries will be found even more docile and tractable than when removed from associations which make life happy for them and inspire a feeling of contentment which they can never feel in other lands. That they will ever migrate in great numbers is now extremely improbable, at least until they have attained at home a much higher civilization than they now possess, and it is John Chinaman at home, rather than John Chinaman on our own soil, whose competition the American workingman has to fear. We believe that China and Japan will, in time, practically monopolize many departments of manufacture now successfully and extensively prosecuted in other countries, and whether that time is near or remote depends, in a great degree, upon the results of the efforts now making to open all China to commerce, and to develop its vast, but hitherto neglected, commerce.

Disbanding of the Crispin Order.

The formal dissolution of the order of Knights of St. Crispin, in Massachusetts, the stronghold of the society, is a fact of much interest as showing the tendencies of the labor movement in this country. A year ago this order was one of the most formidable labor organization in the United States. It was very strong in numbers, and included within its ranks so large a proportion of those engaged in the various branches of the shoe manufacturing industry, that it exercised an almost absolute control over the trade. But the mistake made by the order was in arraying itself in open and declared hostility to capital, and inviting by overt acts the organized opposition of employers, and in the struggle which ensued capital triumphed. Indeed, it became a question at one time whether the union would ruin the trade or employers break up the union, but labor has no resources with which to maintain a struggle against the resources of capital, and the order was driven to the wall. That such has been the case no one has any good reason to regret, for organizations of this kind can confer no benefit upon the workingmen, and their only function is to stir up strife and dissension that demagogues and idlers may thrive upon the squandered earnings of honest, but misguided, labor.

The failure of this society, which has always been instanced by the partisans of trade unions as a conspicuous example of the success of the movement, cannot fail to have a beneficial effect in opening the eyes of the workingmen to the folly of maintaining a causeless and profitless war upon capital. To maintain the Order of the Knights of St. Crispin has cost the shoe-makers of Massachusetts much time and money, and all they have for it now is the humiliating reflection that they have injured themselves and their business without gaining any advantage whatever. Employment is less plentiful, and wages lower to-day than they would have been had labor and capital co-operated harmoniously to promote their common interest, and when the Crispins reflect upon the time and money they have wasted in carrying out the futile plans of their unprincipled and ignorant leaders, they must find the recollection far from comforting. Such associations are fatal to industry and thrift, and the time is not far distant when self-respecting mechanics in all trades will declare their independence of all rules and regulations devised for the benefit of the idle and unskillful, and which deny to those who respect them that freedom of action within the law which every citizen claims as his natural and inalienable right. Nothing that interferes with contracts between master and man can benefit skilled labor, and the fate of the Crispin order shows that such interference cannot long be maintained, however powerful may be the organization which attempts it.

Common Sense and Protection against Fires.

The Insurance Commissioner of the State of Massachusetts concludes a statement of the reforms shown to be necessary by the recent heavy losses of Boston from fire, with a recommendation to the effect that the Legislature enact a law requiring, as far as possible, the construction of buildings fire-proofed inside as well as outside, and providing suitable protection to property against the danger which always results from the presence of combustible structures or combustible merchandise stored in large quantities in crowded districts of the city. Probably legislation defining more closely the terms upon which building permits may be obtained, and authorizing their cancellation when these terms are not complied with, would result in benefit by obviating certain of the commonest and most serious causes of danger, and it is both possible and desirable to regulate the storage of combustible merchandise by strict laws providing a severe penalty for their violation; but if we are to be exempt from the danger of frequent and disastrous conflagrations in cities, people owning and occupying dwellings, stores and warehouses, must exercise a little common sense, which can never be imparted to them by Act of Legislature. If people would only learn the value of efficient and simple means of putting out fires when first discovered, millions of dollars worth of property would be saved annually. A row of water buckets kept full at all times and in convenient position; a fire extinguisher or two under the charge of some one who knows how to use them effectively; an occasional intelligent examination of flues, heaters, etc.; a proper care of matches or, better still, their abolition, and nine-tenths of the disastrous fires would never get beyond the first puff of smoke. How often do we hear it said, after a destructive fire, that if the watchman or other person who discovered it had only had a pail of water or any other means of fighting it, he could have extinguished it in a minute. And yet merchants carrying heavy and

HOT BLAST STONE COAL.

Missouri No. 1	... \$50.00 @	-4 mos.
" Forge	35.00 @ 36.00	-4 mos.
Ohio No. 1	43.00 @ 45.00	-4 mos.
" Forge	35.00 @ 36.00	-4 mos.
Scotch Pig, No. 1.		

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel	2 lb. \$60.00 @	65 mos.
Missouri	60.00 @ 62.00	-4 mos.
Kentucky	55.00 @ 57.00	-4 mos.
Tennessee	58.00 @ 60.00	-4 mos.
Georgia	60.00 @ 62.00	-4 mos.
Alabama	60.00 @ 62.00	-4 mos.
Machinery and Forge	58.00 @ 60.00	-4 mos.
Blooms	112.00 @ 115.00	-4 mos.

CLEVELAND.

Messrs. REDDINGTON & ADAMS, under date of Aug. 11, write us as follows:—The Pig Iron market has been more active for the past fortnight than for any time since this early spring. Foundry Metal have been in good demand, though prices are not any more favorable. The increased activity in trade, however, must sooner or later bring about firmer and higher prices. Mill crude, Blown Iron from \$35 to \$36 for Red Short. Lake Superior Metal is in demand, although prices, except in the high crude, are a little inclined downward. There is more in the market for immediate delivery than for the season previously. Quotations are nominally as follows:

LAKE SUPERIOR CHARCOAL FOR CAR WHEELS AND MALLEABLE USE.

No. 1	... \$57.50 @	-4 m.
No. 2	65.50 @ 50.00	-4 m.
No. 3	55.00 @ 50.00	-4 m.
No. 4	60.50 @ 50.00	-4 m.
No. 5	65.50 @ 50.00	-4 m.

COLD BLAST CHARCOAL.

No. 1 Tennessee	... \$60.50 @	-4 m.
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ANTHRACITE.

No. 1 Onondaga	... \$45.50 @	-4 m.
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IRON ORE FROM ALL LAKE SUPERIOR ORE.

No. 1 Tifly, according to brand	... \$45.50 @ 47.50	-4 m.
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No. 2	43.50 @ 45.50	-4 m.
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Gray Forge	... 35.50 @ 40.00	-4 m.
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BLACKBAND IRON FROM WAREHOUSE—SCOTCH.

No. 1 Glengarnock	... \$50.00	-4 m.
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No. 1 Eglinton	53.50 @ 50.00	-4 m.
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No. 1 Ayresome	65.50 @ 50.00	-4 m.
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AMERICAN.

No. 1 Massillon	... \$50.50	-4 m.
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No. 1 Volcano	... \$50.50	-4 m.
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IRON ORES.

Lake Superior Specular	... \$10.50	9.50
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IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending

August 12, 1873:

Hardware.

Austin, Baldwin & Co.

Wire, cks. 2

Boker Hermann & Co.

Casks, 18

Mds. pkgs. 4

Packages, 7

Beams & Murray.

Wire, pkgs. 10

Bodenheim, Meyer & Co.

Mds. pkgs. 1

Packages, 5

Baldwin J. W.

Casks, 1

Davenport & Co.

Casks, 2

Fiel'd A. & Co.

Mds. pkgs. 38

Frass P. A. & Co.

Mds. pkgs. 38

Fulmer Bros.

Files, casks 1

Hiltner & Sons.

Mds. pkgs. 4

Harmar Wm. & Co.

Casks, 3

Cases, 2

Hawthorne E. V. & Co.

Mds. pkgs. 44

King H. & J. W.

Mds. pkgs. 8

Lamson.

Arms, co. 7

Lau & Garlicks.

Mds. pkgs. 1

Chains, cks. 12

Per. cap. cases, 3

Mason John W. & Co.

Wire rope, coils, 18

Nicol & Davidson.

Cans, 2

Phelps, Babb & Co.

Cases, 1

Roosevelt S. & Co.

Packages, 2

Rosenthal J. & Co.

Packages, 4

Strasburger & Phoeffer.

Cans, 31

Schroeder & Daly.

Mds. pkgs. 3

Sawyer John.

Wire rope, coils, 4

Van Wart & McCoy.

Mds. pkgs. 14

Wichbusch F.

Chains, 64; cks. 12

Bruce & Cook.

Mds. pkgs. 120

Dickerson J. S. & Co.

Tin plates, bxs., 1931

Tin Ingots, 257; bbls., 10

Lead, cks., 5

Moro G.

Scrap, copper, bxs., 7

Phelps, Dodge & Co.

Tin plates, bxs., 7471

Antimony, cks., 50

Tin, slabs, 260

Order.

Tin plates, bxs., 4333

Lead, phs., 1324

Black lead, cks., 40

Tin, Ingots, 300; slabs, 912

Metals.

Bartleth R.

Scrap, copper, bxs., 12

Lead, phs., 1324

Metals, cks., 5

Moro G.

Lead, cks., 5

Metals.

Bartholomew, R.

Scrap, copper, bxs., 12

Lead, phs., 1324

Metals, cks., 5

Moro G.

Lead, cks., 5

Metals.

Brown Bros. & Co.

Scraps, 77

Bussing, Crozier & Co.

Pig, tons, 95

Congreve Chas. & Son.

Rails, 92

Fish plates, bbls., 6.0

Henderson Bros.

Pig, tons, 300

Hopkins H. & Co.

Hoop, bbls., 1000

Lang W. Bailey & Co.

FOREIGN.

GREAT BRITAIN.

Messrs. J. Berger Spence & Co., London, Glasgow

and Manchester, under date of July 26, 1873, report:

"A dull, monotonous feeling has possession

of the market, and both producers and consumers

are anxiously watching the present course of events;

and in the seeming inability of correctly anticipating the future, are most anxious to confine their transactions to bare necessities." Scotch Pig Iron has not varied much in value and character steady; the shipments for the past week were 9629 tons, against 17,108 tons in the corresponding week of 1872. There is a willingness to sell shown on the part of smelters in the Cleveland district, and lower prices than those demanded a week or two ago have been accepted. For manufacturers there is little inquiry, and many of the works, both in Bradford and elsewhere, are now only running short-time, and in some instances are totally closed. The heat of the past few days has also had a diminishing effect on the production. Copper has shown a little more activity, and the likelihood of our supplies from England, both for tough and manufactured, is still the rule. A general message just received reports that the charters from the Baltic Coast for the fortnight ending 2d instant amount only to 900 tons, which will probably favorably affect prices. Tin is very irregular, and it is almost impossible to get a reliable quotation. In Lead, the existing strength in Spain, and the likelihood of our supplies from France, are greatly restricted, if not altogether stopped, has not had much effect on prices here, but it is just possible that a smart reaction may shortly take place, and the present slight depression in this metal make way for renewed activity and improved value. There is not much doing in Spelter, and lower prices have been accepted.

"IRON—'Ayresome'—Yorkshire Pig Iron, No. 1, 12 lb. No. 2, 115; No. 3, 112.6; No. 4, (Foundry, 111.6) 5 lb. (Pig, 116) 6 lb. net cash, or 2/ extra 4 months' bills." Scotch Pig, warrants, 108, to 109. Staffs'dre Bars, £12.10 to £12.15. Hoop Iron, £14 to £15. Gas Tubes, 40 per cent. off new list. Boiler Tubes, 15 per cent. discount.

COPPER—English Tough Ingots, £28 to £30. Chill Bars, £29 to £32.

TIN—English Ingots, £130 to £132. Straits, £128 to £130.

TIN PLATES.—Best Coke, I. C., 34 to 39; Charcoal, I. C., 40/ to 44; per ton.

LEAD.—Best English Soft Pig, £23. to £28. Refined Red Lead, £25 to £27.

ANTIMONY.—French Star, £50 to £60.

SPELTER.—Silesian Special Brands, £25. 10 to £28. English, Best Brands, £26.

COLD BLAST CHARCOAL.

HANGING Rock Car Wheel 2 lb. \$60.00 @ 65 mos.

THE
ARCTIC
FREEZER.



BEST.

Send for Price List.

E. S. & J. TORREY,

166 Fulton Street, New York,

THE
DIAMOND.
THE LATEST INVENTION.



SELF FEEDING, BASE BURNING

COAL STOVE!

With Solid Iron Fire Pot.

With Illuminated Anti-Clinker Opening.

With Patent Double Grate.

With Center Dump.

With Large Return Flues.

Takes the Lead of the Entire Family of Base Burners.

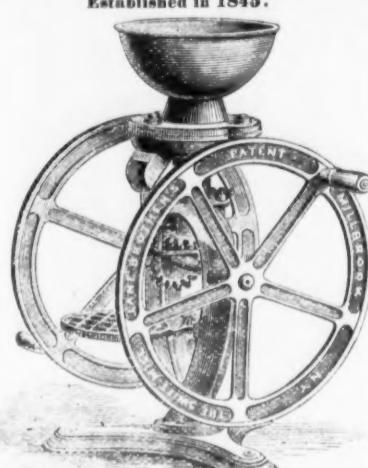
FOUR SIZES, Nos. 18, 23, 28, and 34.

MANUFACTURED BY

JEWETT & ROOT, Buffalo. JEWETT & ROOT, Chicago.
JEWETT & ROOT, Detroit. JEWETT & ROOT, Milwaukee.

Send for Catalogue and Prices.

The Swift Mill.
Established in 1845.



Letter "B" Geared Counter Coffee or Spice Mill.

Stands nearly 2½ feet high. Is highly finished, colors deep Vermilion and Gold. We make more than 30 different styles of Mills.

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LANE BROTHERS, Millbrook, N. Y.

Water Filter.



Jewett's Patent.

A perfect success, accomplishing results never claimed for any Filter ever before invented. This Filter is now the acknowledged Standard all over the United States and Canadas.

Send for Circular.

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JNO. C. JEWETT & SONS,
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Foreign Hardware
Commission Merchants.PRINCIPAL OFFICES,
Birmingham, England, Nos. 66 & 67 Parade.
Sheffield, England, No. 23 Westfield Terrace.
New York, U. S., Nos. 47 John and 5 Dutch St.BRANCH OFFICES,
Philadelphia, Cincinnati, New Orleans and
Montreal.Shipping Office,
Middleton Building, No. 1 Rumford St.,
Liverpool.VAN WART, SON & CO.,
Hardware Commission Merchants,
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48 Chambers Street, New York.
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At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for the

John Rimmer & Son's Celebrated Harness and other Needles.

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FORWARDING AGENTS,
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SCHOLEFIELD GOODMAN & SON

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GENERAL
Hardware Merchants,
BIRMINGHAM, - ENGLAND.
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Manufacturers of the renowned Cooking Stoves, FASHION, for wood, and MONITOR, for coal and wood, and the greatest variety of Coal and Wood Heating and Cooking Stoves. A large stock constantly on hand, and all orders filled promptly. (Send for Catalogue and Price List.)

WM. RESOR & CO., Cincinnati,

Four Sizes. Coal or Wood
Shaking and Dumping Grate,
and Swing Top.

SWISS

Made from pure

Very Musical.

One of these Bells
is more pleasing to
This cut represents
smallest Bell, and are
Silver Plated or Nickel

Send for

TAYLOR

NEW BRITAIN,

Exclusive



BELL,

SWISS METAL.

Very Pretty.

half the size of an orange
be heard further, and
the ear.
the full size of the
made either Polished,
Plated.

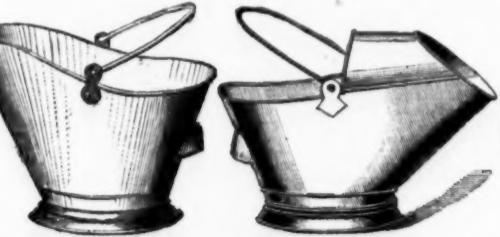
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CONNECTICUT,

Manufacturers.

Coal



Hods.

STAMPED CORRUGATED RIVETED BOTTOM IN SIX STYLES.

SMITH, BURNS & CO.,

Manufacturers of

Galvanized and Japanned Sheet Iron Goods and Tin Ware, Fry Pans, Broilers, Ash Cans, Garbage Buckets, Chamber Pails, Tea Kettles, Wash Boilers, Water Pails, Well Buckets, Toilet Ware, &c., &c. Exclusive manufacturers of the Patent Combined Chamber and Commode Pail. Stamped and Plated Ware.
Warehouse, 46 Cliff Street, between Bookman and Fulton Streets, NEW YORK.

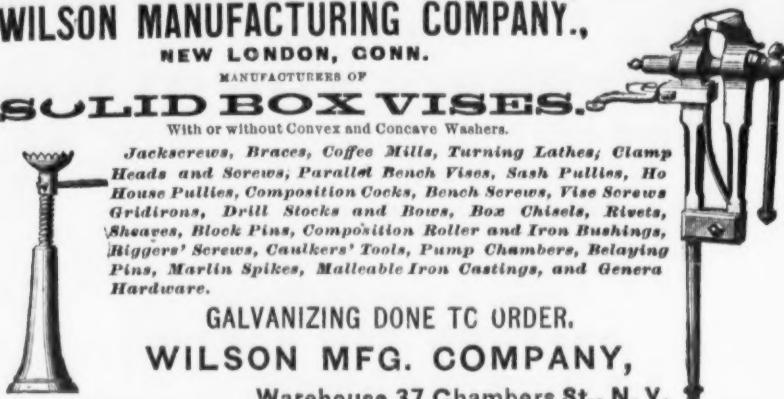
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MANUFACTURERS OF

SOLID BOX VISES.

With or without Convex and Concave Washers.



Jackscrews, Braces, Coffee Mills, Turning Lathes, Clamp Heads and Screws, Parallel Bench Vises, Sash Pulleys, Ho House Pulleys, Composition Cooks, Bench Screws, File Screws Gridirons, Drill Stocks and Bows, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Riggers' Screws, Caulkers' Tools, Pump Chambers, Belaying Pins, Marlin Spikes, Malleable Iron Castings, and General Hardware.

GALVANIZING DONE TO ORDER.

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J. D. FARRINGTON, Jr.,

38 Murray Street, New York.

MANUFACTURERS OF

Japanned, Plain and Stamped Tin Ware,

THE PATENT SELF-RIGHTING CUSPADEORE



Thirty-Six Different Styles.

Is superseding all others. Being made of METAL it will not break, and as the lower part is
CAST-IRON will not corrode as quickly as other articles composed of sheet metal for the same purpose, and if upset, it rights itself immediately.

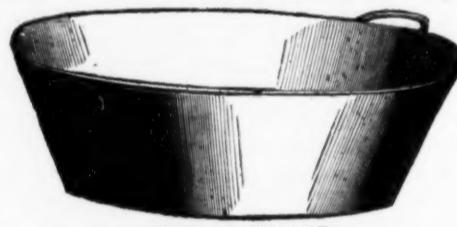
J. D. FARRINGTON, Jr., SOLE MANUFACTURER.

Price List of Self-Righting Cuspadores:

Class A, Seven Patterns	•	•	•	•	•	•	•	\$15.00 per dozen.
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" C, Eight "	•	•	•	•	•	•	•	21.00 "
" D, Eleven "	•	•	•	•	•	•	•	24.00 "
Nickel Plated, No. 1	•	•	•	•	•	•	•	48.00 "
" " No. 2 (small)	•	•	•	•	•	•	•	42.00 "

Established 1836.

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FRENCH WARE, STAMPED AND JAPANNED TIN WARE.

Also, a Large Variety of Useful Articles.

DEALERS IN

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Please send for Illustrated Catalogue and Price List.

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Malleable and Light Gray Castings,
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Special attention paid to Jobbing and General Pattern Work.

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Steam Engines, Boilers & Heavy Machinery of all kinds, and Heavy Forgings.

FORD'S PATENT STOVE, for heating Air for Blast Furnaces.

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Castings from Gun Metal, guaranteed 30,000 pounds per square inch.

The "EMPIRE," a Fan Blowing PORTABLE FORGE,

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Without BELTS or BELLOWS.

It is more EASILY WORKED, gives a BETTER BLAST, and is the CHEAPEST Forge made, and

IT HAS NO BACK DRAUGHT.

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And 118 Chambers Street, NEW YORK.

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THE IRON AGE.

The Improved Patent Universal Angular and Ratchet Drilling Machine

Adjustable to any angle, and easily carried to any part of the shop for making Repairs.

Over 4000 of these machines are now in use, and the demand is steadily increasing.

Dealers will find them of ready sale and at satisfactory profits.

These machines were formerly sold by Messrs. Holland & Cody, and Duryea & Kelley, but since the Miller's Falls Co. purchased the patent and began to make them exclusively in their own shops, the quality and finish has much improved, and they are now really desirable goods. These Drilling Machines are for sale in most of the larger cities at our regular prices, but where they are not so kept we will supply them on demand.

No. 1, weight 26 lb., Drill $\frac{1}{8}$ in. hole.....Price, \$34.00
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No. 3, " 106 lb., " 1 $\frac{1}{2}$ " " " 65.00

With usual trade discount.

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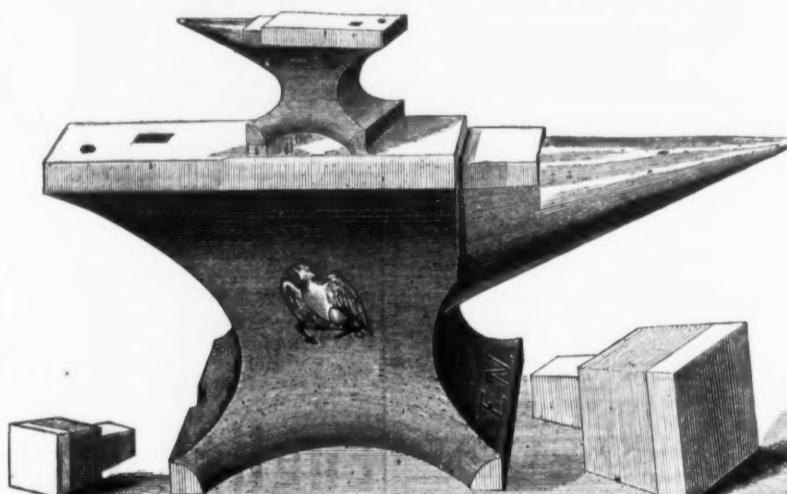
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FISHER & NORRIS manufacture also, to special order, Anvils for Saw Makers, File Makers, Axe Makers, &c.; also, Copper Smiths', Silver Smiths' and Tin-men's Stakes and Blocks, with hardened and polished cast steel faces, and the well known Double Screw Parallel Vise.

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ANVILS weighing 100 lbs. to 600 lbs., 12 cts. per lb.

No. 0	1	2	3	4	5	6	7	8	9
Weighing about 10 lb.	15 lb.	20 lb.	30 lb.	40 lb.	50 lb.	60 lb.	70 lb.	80 lb.	90 lb.
Price, \$4.00	\$5.00	\$6.00	\$6.50	\$7.00	\$8.00	\$9.00	\$10.00	\$11.00	\$11.50

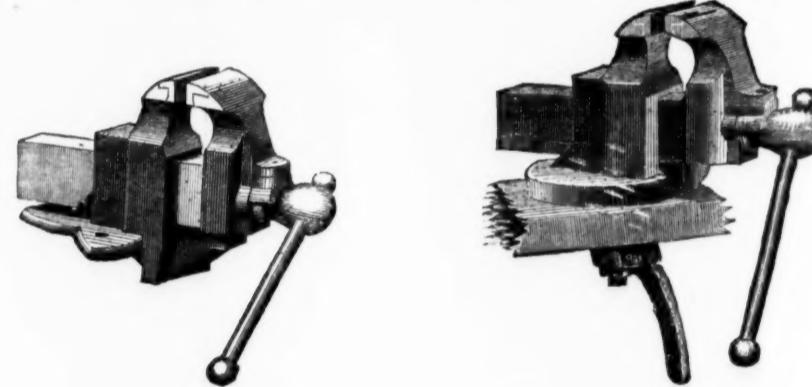
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PARALLEL BENCH VISE.



Manufactured at the

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TRIPLE ACTING RATCHET DRILL, the Simplest, Cheapest and Best.

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HAMMERS,

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BLACKSMITHS'

AND

Stone Masons'

TOOLS,

Bush Hammers,

etc., etc.



AGENTS FOR

Washoe Picks,
Western Files,
Sweet's Crow Bars,
N. Carolina Handles,
Steel Foundry Riddles,
Beaver Falls Cutlery
etc., etc.

Send for Price Lists and Discounts.

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ROY & COMPANY,

West Troy, N. Y.,

Manufacturers of

Wrought Iron Butts, Strap and T Hinges,
PLATE AND HOOK HINGES,
Cold Pressed Nuts and Washers, Felloe Clips, &c.

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MANUFACTURERS OF

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Wrought Butts, Strap and T Hinges.

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Wrought Barrel, Square and Shutter Bolts.

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German Hardware, Cutlery, Scissors, Coffin Lace, Sheep Shears

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Also, Birmingham and Sheffield Hardware and Chains, Butcher's Files, Edge Tools & Razors, Wostenholm's Razors & Farriers' Knives, John Wilson's Butcher Knives and Steels, Stub's Tapers, Chesterman's Metallic Tapes, Isaac Greave's Hedge Shears, James Bees & Parkin's Spoke Shaves, Turn Screws and Braces, Pad Locks, Goulcher's Gun Locks, Brades Trowels, &c.

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Proprietors of the MANHATTAN CUTLERY CO., "O. K." Razors.

Sole Agents for LAMSON & GOODNOW MFG. CO., Shelburne Falls, Mass.—Table Cutlery and Butcher Knives.

W. & S. Butcher's Files, Edge Tools and Razors, the largest stock in the United States. Geo. Wostenholm & Son's Knives, Scissors and Razors, the largest stock in the U. S. John Wilson's Butcher and Shoe Knives.

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We always have on hand a full assortment of German and English Hardware, Cutlery, Guns, Gun Material, Chains, Heavy Goods.

JOHN WILSON'S CELEBRATED

BUTCHERS' KNIVES,
BUTCHERS' STEELS,
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SHOE KNIVES.

THE TRADE MARK, IN ADDITION
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IS STAMPED UPON EVERY ARTICLE MANUFACTURED BY

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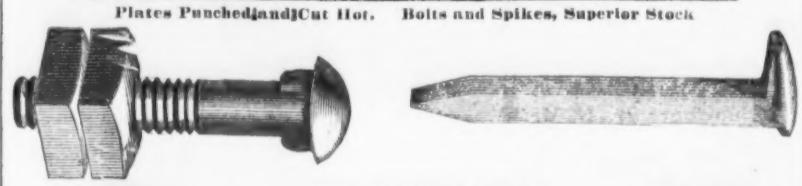
GRANTED A.D. 1766, BY THE
CORPORATION OF CUTLERS OF SHEFFIELD,
AND PROTECTED BY ACT OF PARLIAMENT.
Works:—SYCAMORE STREET, SHEFFIELD. ESTABLISHED in the Year 1750.

BEAM & MURRAY,
IMPORTERS OF
Anvils, Chains, Pocket Cutlery,
Guns, Files,
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PRATT & CO.,

BUFFALO IRON and NAIL WORKS, Buffalo, N. Y.

Branch Office, 55 Chambers Street, New York.
Manufacture Bar, Angle, and Plate Iron, Spikes and Nails, Railroad Fish Plates, Bolt and Spikes, Railroad and Contractors' Supplies in general, Bolt Blanks, Coach Screws "Adams Nut Lock."

All sizes constantly on hand. We use the best Lake Superior Iron, and make a uniform handsome nut. Orders solicited. We make washers a specialty. Also

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NATIONAL STOVE POLISH CO.

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General Agent for HEAFFORD'S

English Boiler Compound,
IMPROVED.

For preventing and destroying scale deposits in Steam Boilers. Acts entirely on the Scale, and not on the Iron. Gives no smell or coloring to the steam, and is the best article now in use.

READ THE FOLLOWING:

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June 13, 1873.

We have used the Compound in our boilers (thirty in number) for FIVE YEARS, and find it a matter of necessity. We have no trouble with foul boilers. After trying many other kinds, we decide the "HEAFFORD" to be the best.

Please deliver six barrels at our works at once. Yours, truly,
Circulars, with price and directions, forwarded on application.

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Office and Works
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No. 298 Broadway,
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FINE FLAT-KEYED LOCKS for all Purposes.

RIM and MORTISE STORE DOOR LOCKS,

Heavy Front Door and Vestibule Locks.

Rim and Mortise Night Latches,

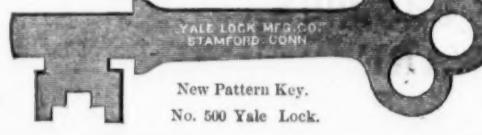
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Post Office Lock Boxes and Prison Locks,

Leeds' Gate Fixtures, Field's Shutter Bars, etc., etc.

The Yale Lock Manufacturing Co.,

STAMFORD, CONN.

The Best
TUMBLER
LOCK
Ever Made.Samples sent
on
Application

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VALVES

(Double and Single Gate, $\frac{1}{2}$ in. to 36 in.—outside and inside Screws, Indicator, &c.)

for Gas, Water and Steam.

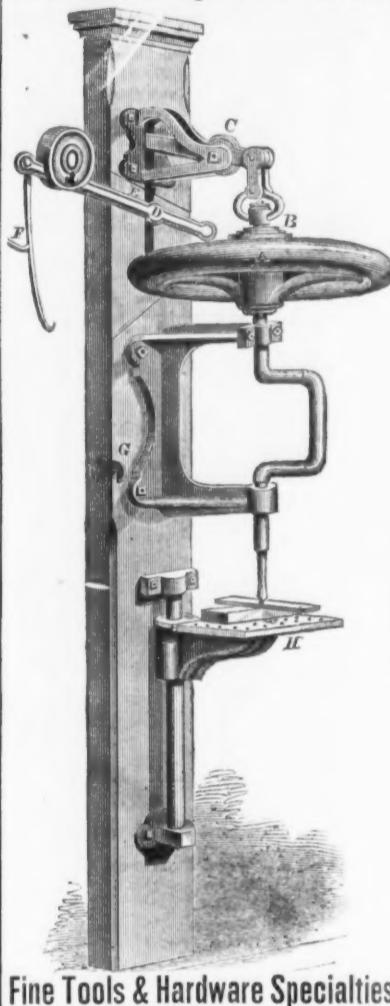
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ALARM
TILLS,
FOR SALE BY

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BIDDLE MANU'FG CO.
PATENT
Self Feeding Hand Drill,

Fine Tools & Hardware Specialties

Warerooms,
78 Chambers Street, N. Y.Send for catalogue. Sole Agents for the Pacific Coast,
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THE

Peck, Stow & Wilcox Co.,

MANUFACTURERS OF

TINNERS'

Tools and Machines,

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GENERAL HARDWARE

97 Chambers Street, New York.



Blacksmiths' Hand Drill.

Manufactured by MORRELL & TIEBOUT,
Cor. of Grand & First Sts., Williamsburg, N. Y.
Send for Circular and Price List.

New York Wholesale Prices, August 13, 1873.

HARDWARE.

Apple.

Solid Cast Steel.

P. 14¢

Wright's.

In gold 12½¢; over 250 lbs 13¢; gold

Armitage's Mouse Hole.

Armitage's.

Wright's.

11½¢

Eagle Avril Co. 15¢.

Eagle Avril Co. 15¢.

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Turn Table.

Lightning.

Reading.

Conqueror.

10¢.

Bay State, Paring, Coring and Slicing.

15¢.

5¢.

Skeleton.

19¢.

Climbing.

11¢.

State Peace Pare.

11¢.

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11¢.

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7¢.

Anglers and Bits.

Snel Mfg. Co.

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No. 1.

Hollow Augers.

Cushman's Expanding Hollow Augers.

15¢.

Hollow Augers.

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15¢.

Balances.

Citation.

Fancy.

Morton's.

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Plated.

Iron.

Brass (Plated list).

Add 15¢ to 5¢.

Orbits.

Bells.

Hand, Light Brass.

White Metal.

Globe.

Sax Hand.

Abbe's.

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Western Song.

Brick Cray.

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Hart Mfg. Co. Crank and Pull.

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Dodge's Genuine Kentucky.

Yaw's Genuine.

Bellows.

pneumatic.

Moudlers.

Blind Fasteners.

van Sand's.

Washburn's Patent.

Merriman's.

Blind Staples.

Boarded at 1 cent, ½ in. and larger.

Add 15¢ to 5¢.

Bolts.

Cast Iron Barrel, Shutter, &c.

Wrought Iron Barrel.

Carriage and Tire, Common.

Norway Iron.

Star, Philadelphia.

Erie, Philadelphia.

Erie, Pattern, P. & S. W.

Carriage and Tire, R. B. & W.

Plow, R. B. & W.

Stove, R. B. & W.

Undercut Co.

Machine.

Machine.

Borax.

For case of 100 lbs.

Horing Machines.

Kelllogg's.

Saxell Mfg. Co. Bee's Patent.

Regular.

Douglas Mfg. Co.

Hovey's.

Uplight.

Morticing Machines, each.

Braces.

Barber's Patent.

M. Mfg. Co.

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Bartholomew's American Ball.

Carrington's.

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(Dealers' Selling Prices.)	
Canvas Linen.....	6 @ 6½
" cotton, No. 1.....	7½ @ 7½
" " No. 2.....	4
White linen rags, No. 1.....	7 @ 7½
" " No. 2.....	5 @ 5½
Colored.....	8 @ 8½
Mixed woolens.....	2 @ 3
Soft woolens.....	6½ @ 7
Gunny bagging.....	1½ @ 2
Jeet Butts.....	1½ @ 1½
Kentucky bagging.....	3½ @ 5½
Book stock.....	4½ @ 4½
Waste paper and scraps.....	2½ @ 3
Rope cuttings.....	1½ @ 3
Kentucky Bale rope.....	4 @ 4½
Oakum junk, No. 1.....	5½ @ 6½
" No. 2.....	4½ @ 4½
Grass rope.....	4½ @ 4½
Tarred Shaking.....	1½ @ 2
Old Metal.	
Copper.....	27 @ 28
Yellow metal.....	18 @ 6
Brass.....	18 @ 20
Heavy Composition.....	31 @ 23
Old lead, solid.....	6½ @ 7
Tea lead.....	12 @ 5½
Wrought iron.....	1 @ 6
Cast iron.....	1 @ 1½
Machinery iron.....	1½ @ 1½
Zinc.....	5½ @ 6
Pewter, No. 1.....	26 @ 27
" No. 2.....	10 @ 12
Spelter.....	7

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters.....	75 @ 20c			
" " Ordinary.....	6c			
" Ivory Drop, fair.....	15c			
" best.....	26c			
Black Paint, in oil.....	kegs, &c.; asst'd cans, 11 c			
Blue, Prussian, fair to best.....	50 @ 75c			
" Chinese, dry.....	88c			
" Ultamarine.....	22 @ 30c			
Brown, Spanish.....	13c			
" Van Dyke.....	.9c			
Carmine, 40.....	\$12 00			
Green, Chrome.....	15 @ 22c			
" " in oil.....	18 @ 22c			
" Paris.....	good, 30c; best, 40c			
" in oil.....	30c @ 4c			
Mineral Paints.....	13c @ 4c			
Orange Mineral.....	14c			
Red Lead, American.....	9½c			
" English.....	.10½c			
" Venetian (N. C.) dry.....	23c			
" in oil.....	asst'd cans, 11c; kegs, 8½c			
" Indian, dry.....	.10c			
Rose Pink.....	.12c			
Stenna, American, raw.....	.4c			
" Burnt.....	.4c			
" in oil.....	15 @ 22c			
" Raw.....	15 @ 22c			
Umber, Burnt.....	.4c @ 8c			
" in oil.....	16 @ 21c			
" Raw.....	16 @ 21c			
Vermillion, Chinese.....	.11 45			
" English.....	.45			
" French.....	.12 28			
" American Common.....	.28			
White Lead, American, pure dry.....	11½c			
" in oil.....	12 c			
White, Parts, English, prime.....	15 @ 22c			
Yellow Ochre, French.....	32c			
" in oil.....	asst'd cans, 11c; kegs, 8½c			
Vermont.....	17 @ 21c			
Chrome.....	17 @ 21c			
Zinc, White, American, No. 1 dry.....	.9c			
" French (Paris).....	11c			
" in oil.....	11c			
Oils.				
Linseed Raw.....	5 gal. casks, 96c; bbls, 97c			
" Boiled.....	" 101 " 102			
Whale, Crude.....	100			
Sperm, Crude.....	100			
" Winter unbleached.....	100			
" Bleached.....	100			
Seal Extra Butter.....	180			
Lard, Pure Winter.....	87c			
" Spring.....	75c			
Cotton Seed, Crude.....	55c			
" White.....	75c			
Neatsfoot, Winter.....	110 @ 115			
Natural Lubricating.....	bbls, 45c			
Sundries.				
Asphaltum.....	5 gal. 97c			
Benzine.....	5 gal. 97c			
Chalk.....	1½c			
" Black.....	1½c			
Dryer, Patent, Am'n.....	asst'd cans, 10½c; kegs, 9c			
" English.....	11c			
Flock.....	.50c			
Frosting.....	.50c			
Gum, White.....	35 @ 45c			
" Sheet.....	30c			
Glaziers' Points, Zinc.....	.9c			
Gum, Glycerine.....	.9c			
" Dark.....	.9c			
" Shellac, English.....	.9c			
Litharge.....	.4c			
Funnel, Stone, Selected Lumps.....	.4c			
" powdered.....	.4c			
Putty in bladders.....	.5c			
Rotten Stone, soft, English.....	.8c			
Spirits Turpentine.....	.4c			
Whiting, Spanish.....	.1c			
Glass.				
French Windows—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.				
SINGLE.				
SIZES.	I.	II.	III.	IV.
6 x 8 to 10 x 15.....	\$10 75	\$9 75	\$9 00	\$8 25
11 x 14 & 12 x 18.....	11 00	10 25	9 75	8 75
10 x 16 & 14 x 20.....	12 50	11 00	10 50	9 50
18 x 22.....	13 25	12 00	10 75	9 50
15 x 26 to 20 x 30.....	15 75	14 00	12 00	10 25
22 x 30 to 26 x 36.....	17 75	16 75	15 75	14 00
28 x 36 to 34 x 44.....	20 75	17 75	16 75	15 00
26 x 36 to 26 x 44.....	22 75	20 25	15 50	
28 x 44 to 30 x 50.....	24 00	21 50	16 75	
30 x 52 to 30 x 54.....	27 25	24 00	18 75	
30 x 52 to 34 x 60.....	29 50	26 25	22 00	
34 x 58 to 34 x 60.....	31 50	29 50	22 00	
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15 x 26 to 20 x 30.....	24 00	21 00	19 00	17 50
22 x 30 to 26 x 36.....	30 75	25 25	20 25	18 50
28 x 36 to 34 x 44.....	34 00	28 50	21 00	19 00
26 x 36 to 30 x 50.....	34 00	32 50	25 25	22 00
28 x 44 to 50 x 50.....	36 00	32 25	26 25	
30 x 52 to 34 x 60.....	41 00	36 00	28 25	
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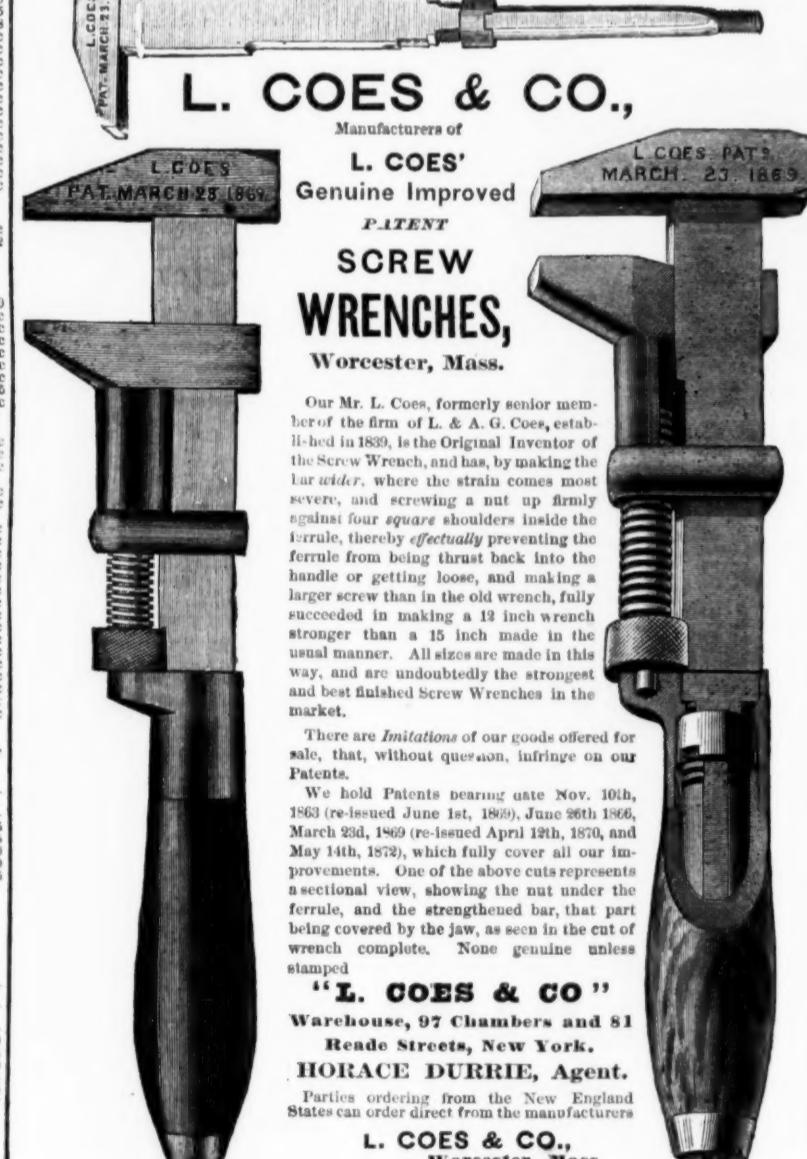
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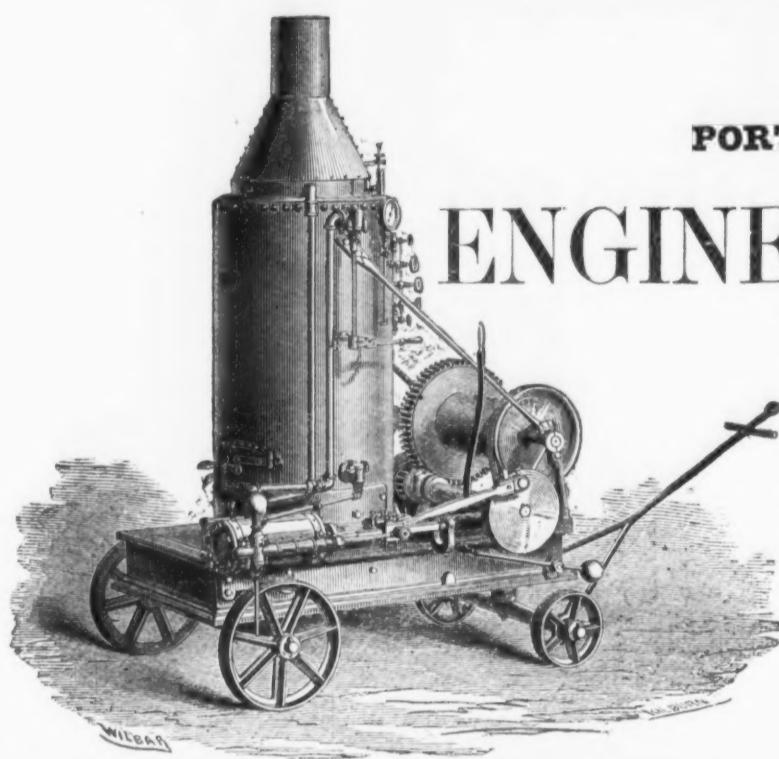
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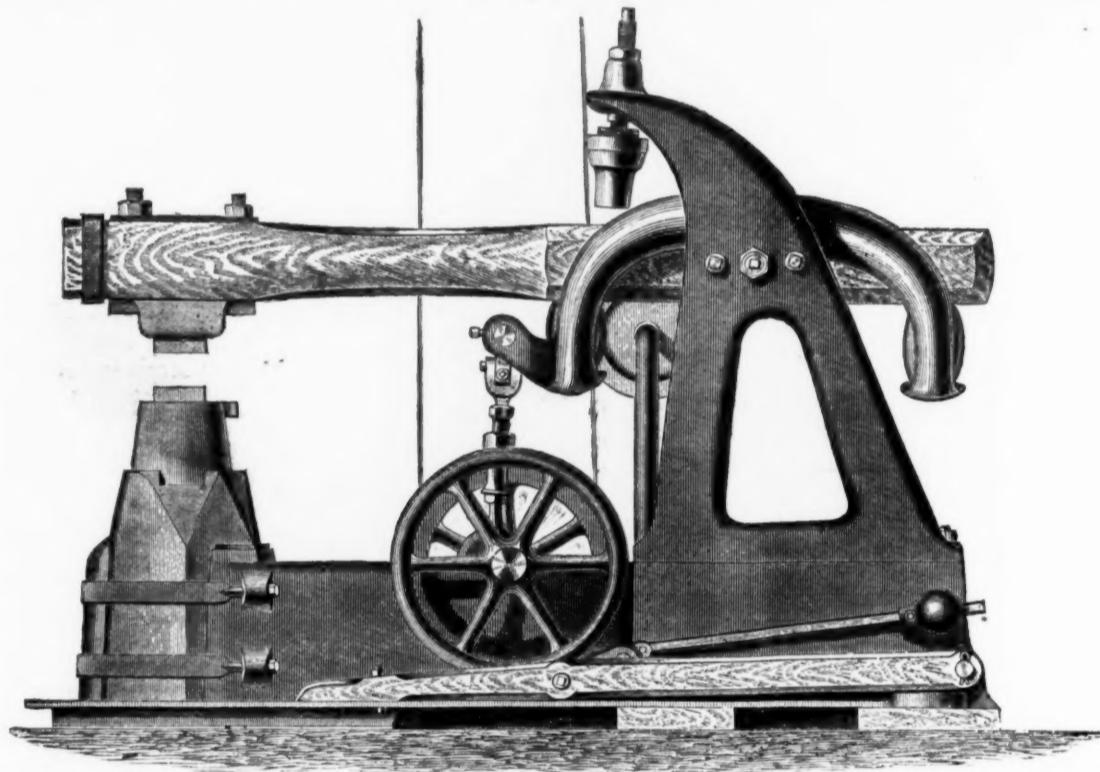
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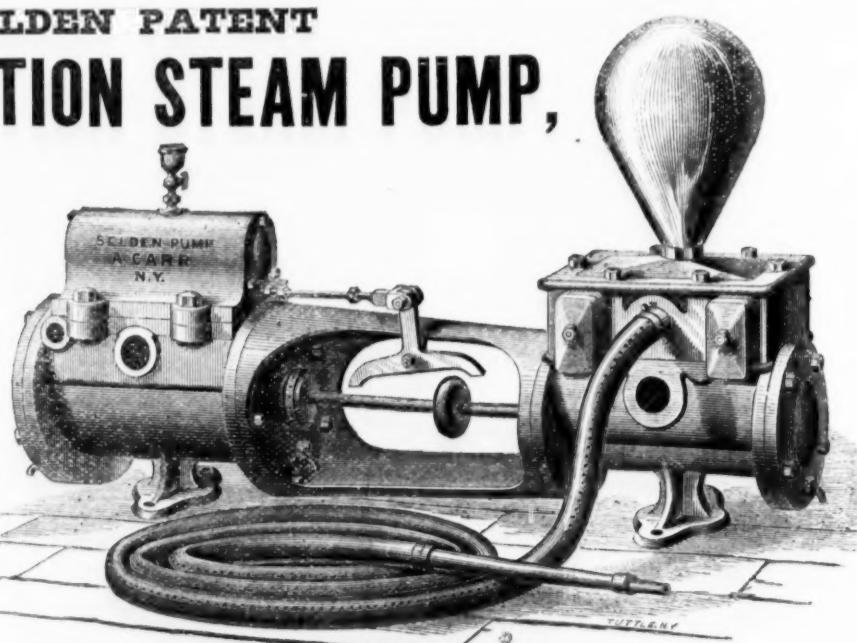
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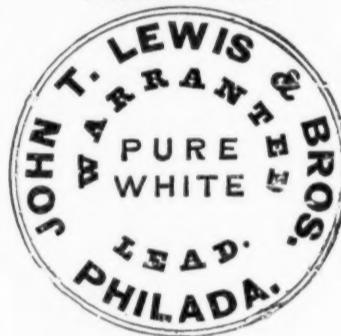
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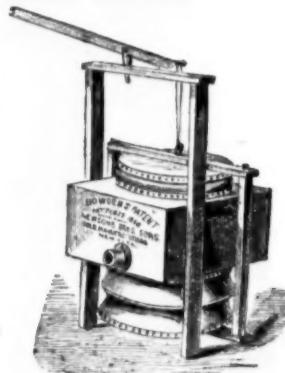
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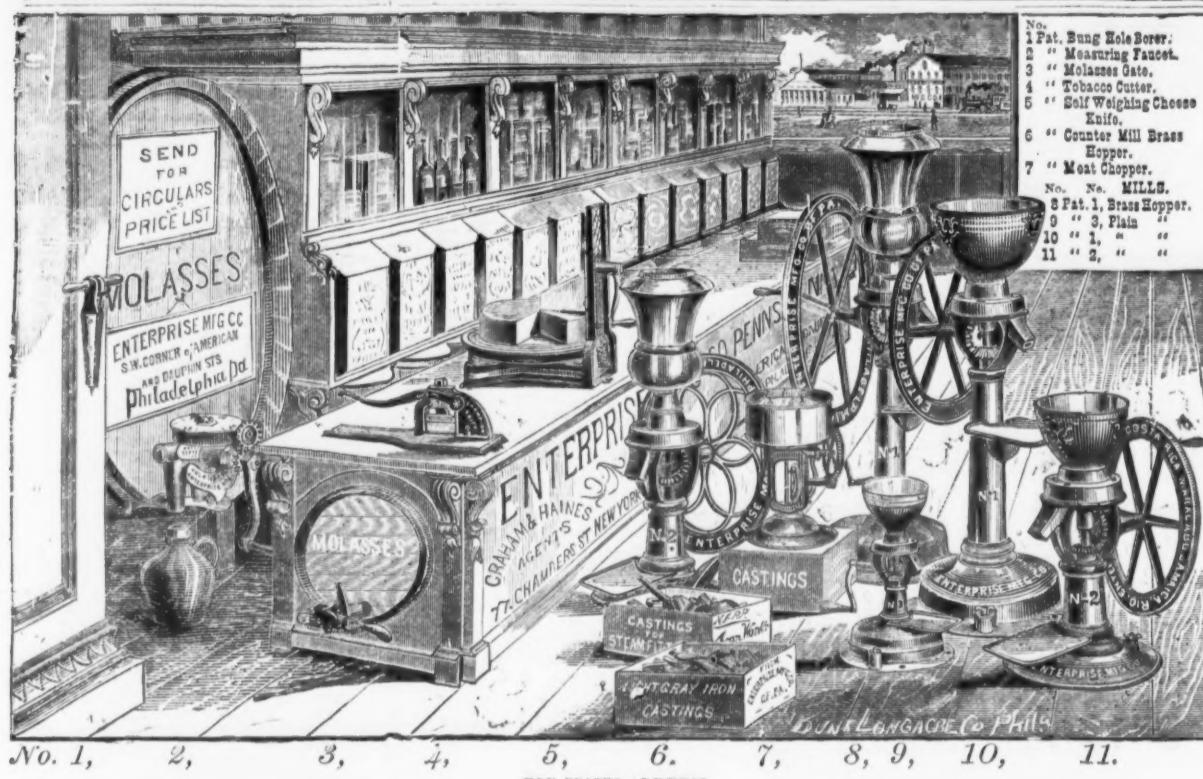
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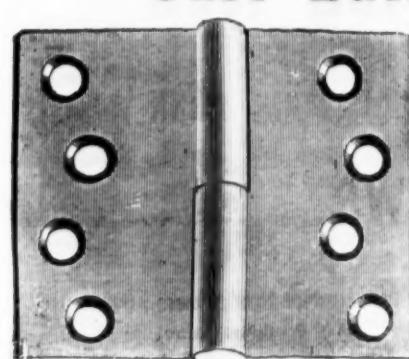
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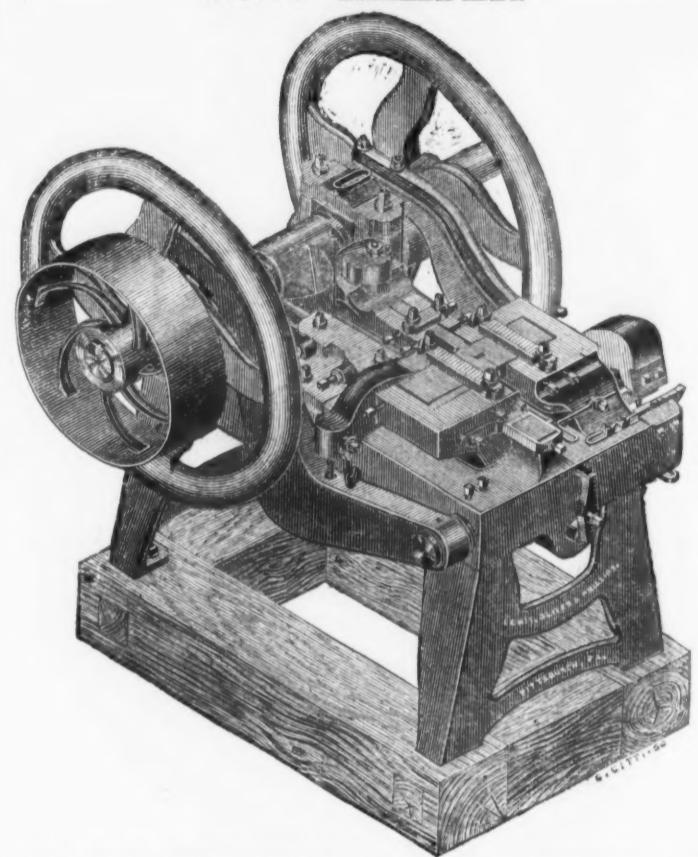
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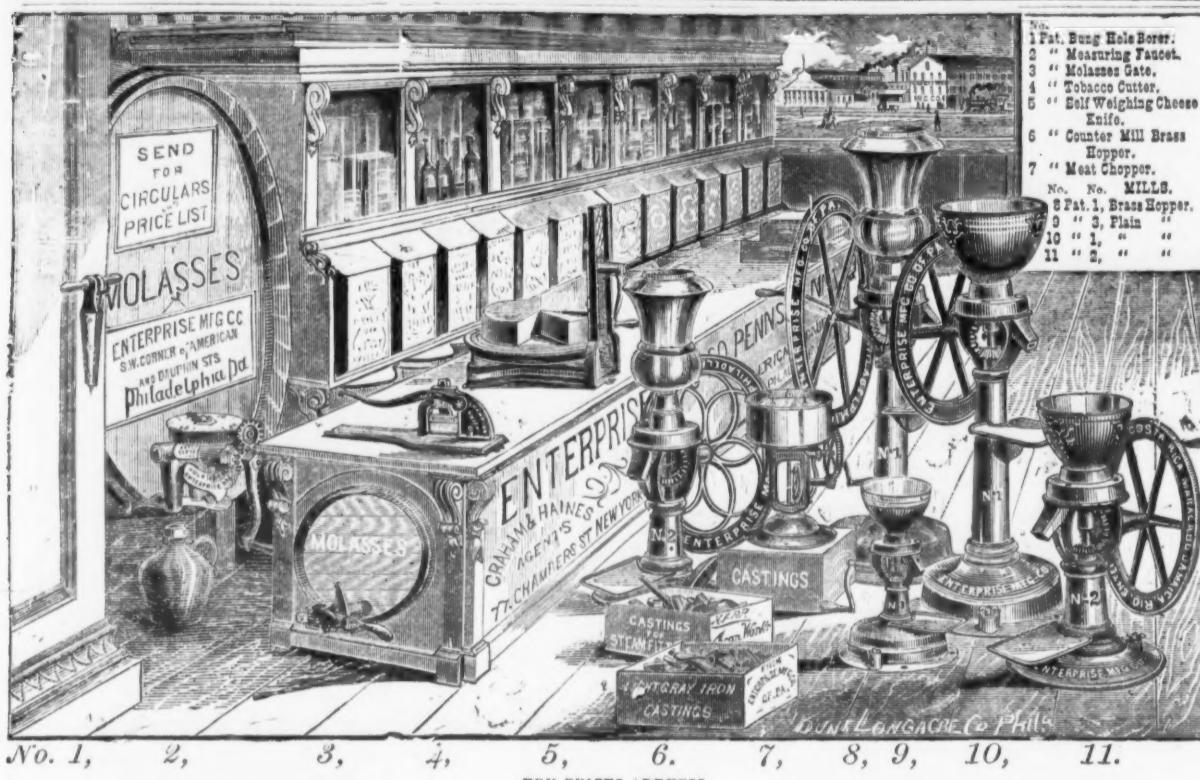
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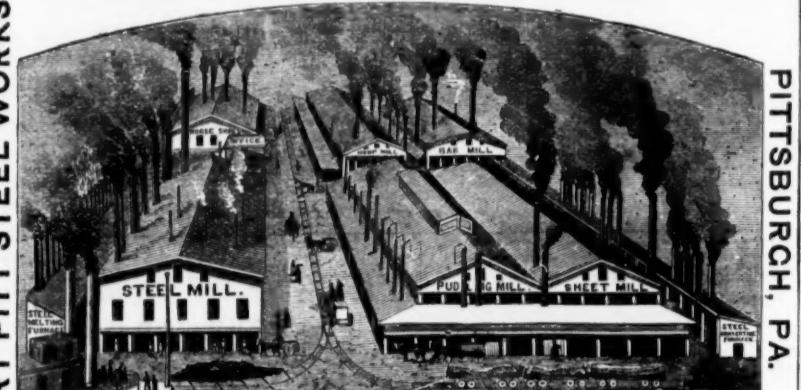
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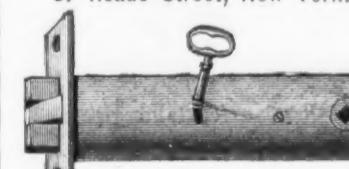
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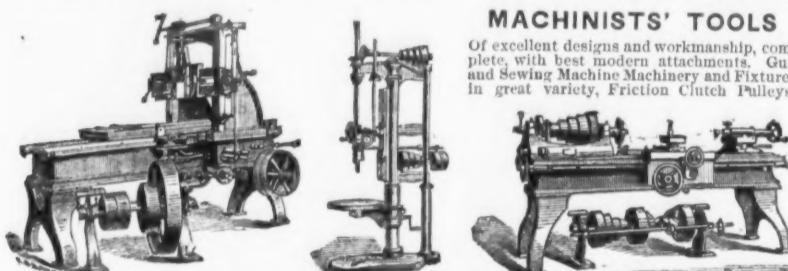
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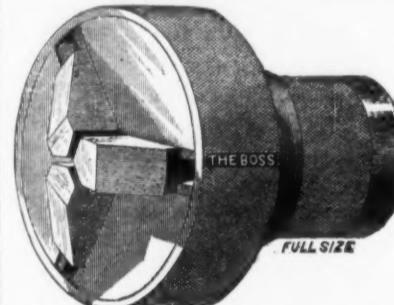
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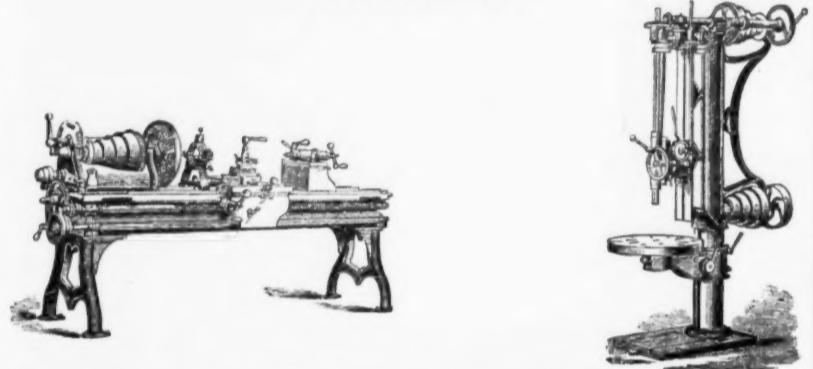
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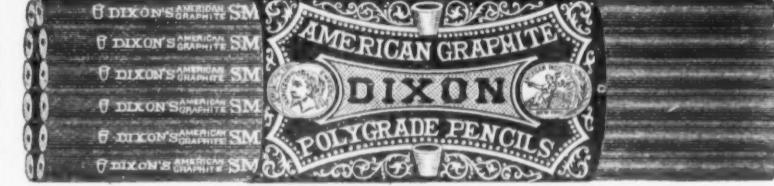
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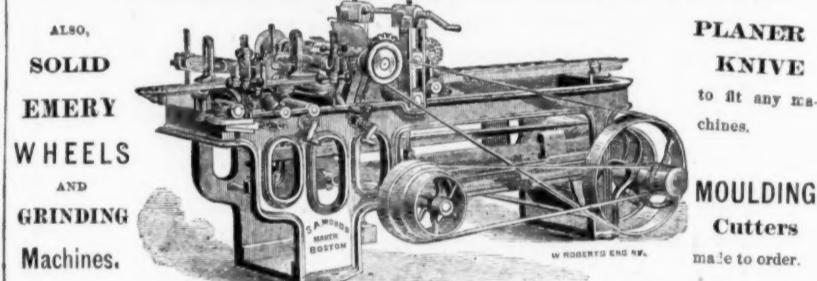
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